

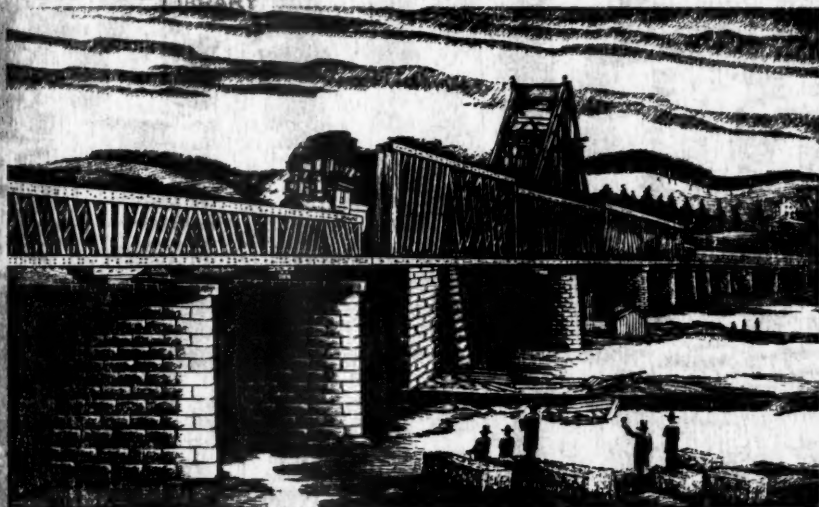
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The Railway and Locomotive Historical Society

BULLETIN No. 87

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In presenting our final publication for the year, amongst the papers included is one from Mr. Paul T. Warner on some of the early locomotive patents. The steam locomotive was the result of the efforts of hundreds of men. No one man or group of men can lay claim to the development of the steam locomotive. That our early pioneers in this field were mindful of economies is shown by a feedwater heater invented and used by Ross Winans on his "crabs" as early as 1837. Mr. Warner has selected some of the more interesting ones for his article and they are all worthy of note.

Biographies of our railroad builders or those identified with these early projects are always worth while and the installment of the Newton papers includes just such material on the men identified with the C. B. & Q. R. R.

We welcome two new contributors—David P. Morgan with his warm account of the Pacific's on the L&N. His contacts with them at Louisville gave him a keen insight to their performance, similar to that of your Editor in his frequent trips to the "Blue Grass State" swinging along the Licking River behind one of them, the whistle calling clearly through those little towns and villages. Those early Pacifics were a friendly looking engine and you liked them better after you had ridden behind them. Harold Kiracofe has prepared an interesting account of a hundred years of the railroad in Elkhart, Indiana. Dealing chiefly with the Lake Shore & Michigan Southern Ry. and the western roads that made up that system,

his paper contains a wealth of data, which, mixed with many incidents should be of interest to our members.

Another newcomer to our columns, and this one from overseas, is our member G. H. Gaskell with his paper on the derivation of the names of the different locomotive classes. Some of these names have already been forgotten, more will be as time passes and the present seemed an opportune time to record them in our journal.

Lastly, your Editor has made a contribution of the through passenger car service from New England to points outside these six states. The railroad timetable with its schedules and through car services has always held a strong appeal to the writer. The older the better. Our Society has a good file but it is not complete enough to state when many of these services commenced or terminated. It may come as a surprise to many of our members to learn that at one time you could mount the steps of a car in the North Station and that same car would take you, without change to Minneapolis or Vancouver, B. C. Yes, in the days past, there were some fine trains with through car services operated out of the North Station and they still operate the fine trains. Such is the "consist" of this publication and we hope that you will enjoy it.

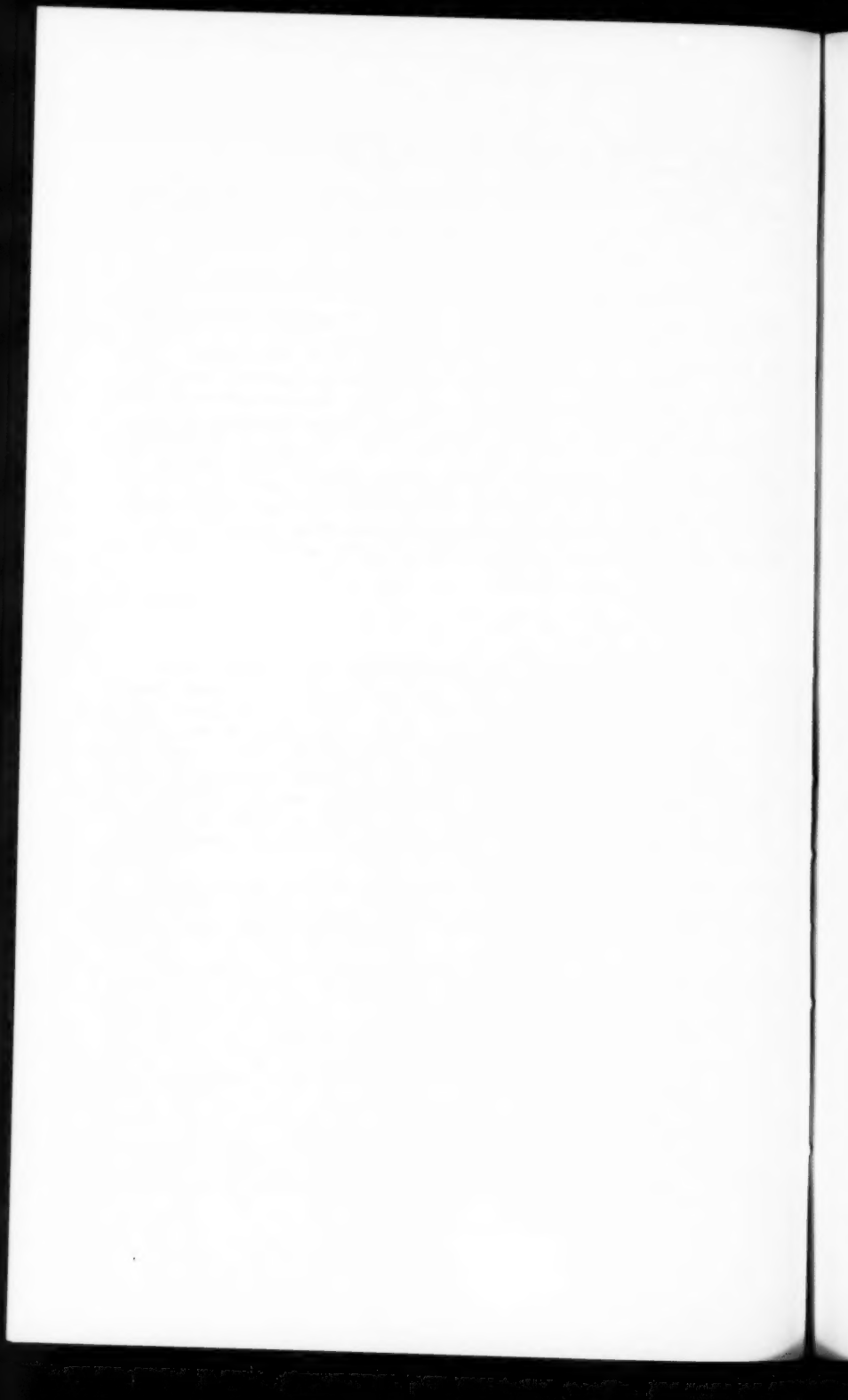


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Some Early Locomotive Patents

By PAUL T. WARNER

One of the most interesting phases of historical research is a study of the patents applying to the device in question. This is especially true of the steam locomotive which, during the entire period of its history, has been the subject of many patents, some of them of unusual interest. Not only do these patents describe locomotives of various designs—some of them “freaks” and impossibilities—but they throw important side lights on the difficulties which confronted the designers of many years ago. Comparatively few persons know anything about these patents, or have opportunity to consult them. The writer has had occasion to study a considerable number of them, and will discuss several which he believes will be of special interest to the readers of the BULLETIN. The illustrations shown are copied direct from the patent papers.

It should be mentioned in this connection, that the total number of patents thus far granted by the United States Patent Office, is well in excess of 2,500,000.

1

Patent No. 308, granted to Ross Winans for “Locomotive Steam Engines,” and dated July 29, 1837.

This patent describes a design of locomotive which was then being built by Ross Winans for the Baltimore & Ohio Railroad. The B. & O., at that date, was building westward from Baltimore, and the line was characterized by an excessive amount of curvature. The majority of the locomotives were of the so-called “grasshopper” type, as originally designed by Phineas Davis. The wheel arrangement was 0-4-0; the boiler and cylinders were vertical, and the movement of the pistons was transmitted to the wheels through two “grasshopper beams” fulcrumed on top of the boiler, and thence through long depending connecting rods, spur gearing, and side rods.

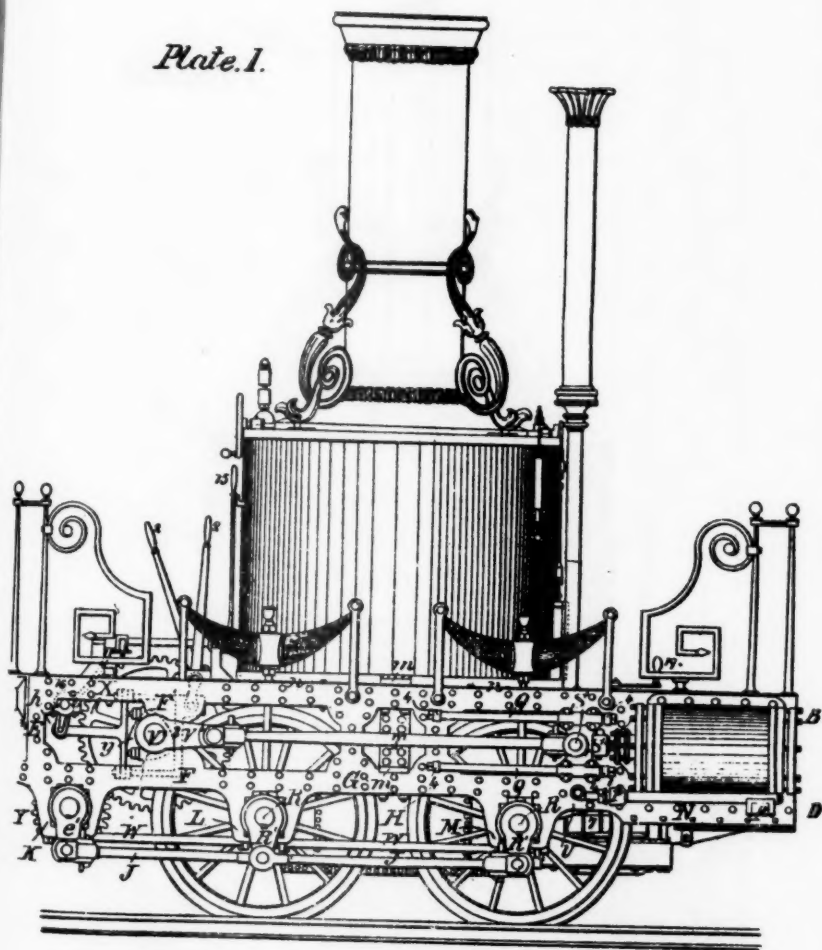
Patent No. 308 opens with a description of a typical English locomotive of the 2-2-0 type, with a horizontal boiler and pistons directly connected to the driving wheels. It is stated that: “Among the advantages of the English engine, as now arranged, are those arising from the center of gravity being brought near the rails, and from the stroke of the piston being exactly, or very nearly in the direction of motion of the engine, and at right angles, or nearly so, with the motion of the springs that support the machinery on the wheels, instead of corresponding therewith, both of which are important requisites in obtaining a uniform, steady and direct motion of the engine on the rails, particularly at very high velocities. Along with these evident advantages in the arrangement of the English engine, there were found to be drawbacks in its use on a

curved and undulating road growing out of the size and distance apart of its wheels, its want of power in the generation of steam, the destruction of the tubes in the boiler, by the action of the fire, and the difficulty of applying the power to all the wheels and yet retain such a diameter as to afford the required speed."

Then follows a description of the "grasshopper" type, referred to as the "Baltimore engine", as follows:

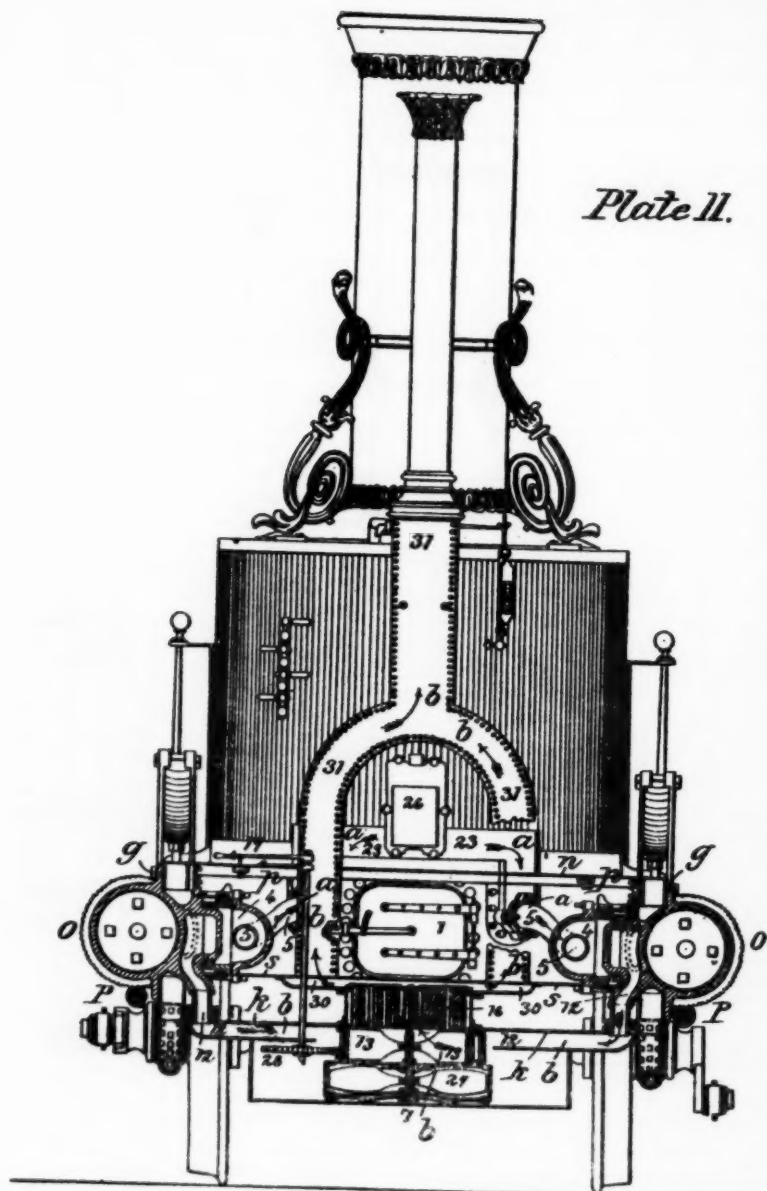
"Among the peculiar advantages of the Baltimore engine may be enumerated its capacity to use anthracite coal as fuel with perfect efficiency, the superior evaporating power of the boiler, and the greater durability of the tubes therein, all of which qualities are attributable chiefly to the vertical position of the boiler, which admits of a larger fireplace than the English horizontal boiler can conveniently afford, as well as a greater number of tubes, the Baltimore engine having as many as four hundred and fifty, while the number in the English engine rarely exceeds one hundred and twenty, thus making it practicable to use much larger cylinders and so increasing the efficiency of the engine on undulating roads, by enabling it to take a greater load in proportion to its weight. The vertical position of the boiler also produces a better and more rapid circulation of the water in it, and so affords a better protection to the parts most exposed to injury from the heat, than has been obtained where the boiler is horizontal. Another and peculiar advantage of the Baltimore engine is obtained by the use of the third axle or shaft, ranging with the axles of the road wheels, and transmitting the propelling power to them as before described, whereby the jar of the bearing wheels being lost in the connecting rods, is prevented from affecting materially the cylinders, pistons, gearing and so forth, which, together with the shafts, are sustained on the springs of the engine. In the English engine the head of the piston rod is connected at once by a pitman with the crank on the axle of the bearing wheels. Again, the use of a large spur wheel, and a small pinion wheel, makes it practicable to employ small bearing wheels, without losing velocity, so that the wheels being brought close together, a curved road with radii not exceeding four hundred feet, that would be impracticable for the five feet wheels of the English engines, may be easily traveled upon. Besides this, the adhesion of all the wheels of the Baltimore engine being used by applying the power to all, it becomes easy to divide the weight of the engine equally upon the wheels, while in the English engine, using the adhesion of but one pair of wheels, the greater part of the weight is made to rest on the driving pair of wheels, to produce sufficient adhesion to make effective the steam-power of the machine. But the many different advantages thus enumerated as resulting from the use of the vertical boiler, and the arrangement of the engine connected with it, have been attended heretofore with a loss of the important advantages above mentioned, as belonging to the English engine. The center of gravity, owing to the position of the boiler and the heavy parts of the engine, the cylinders, working beams, and the attendant fixtures, slides and pitmen, was, of

Plate.1.



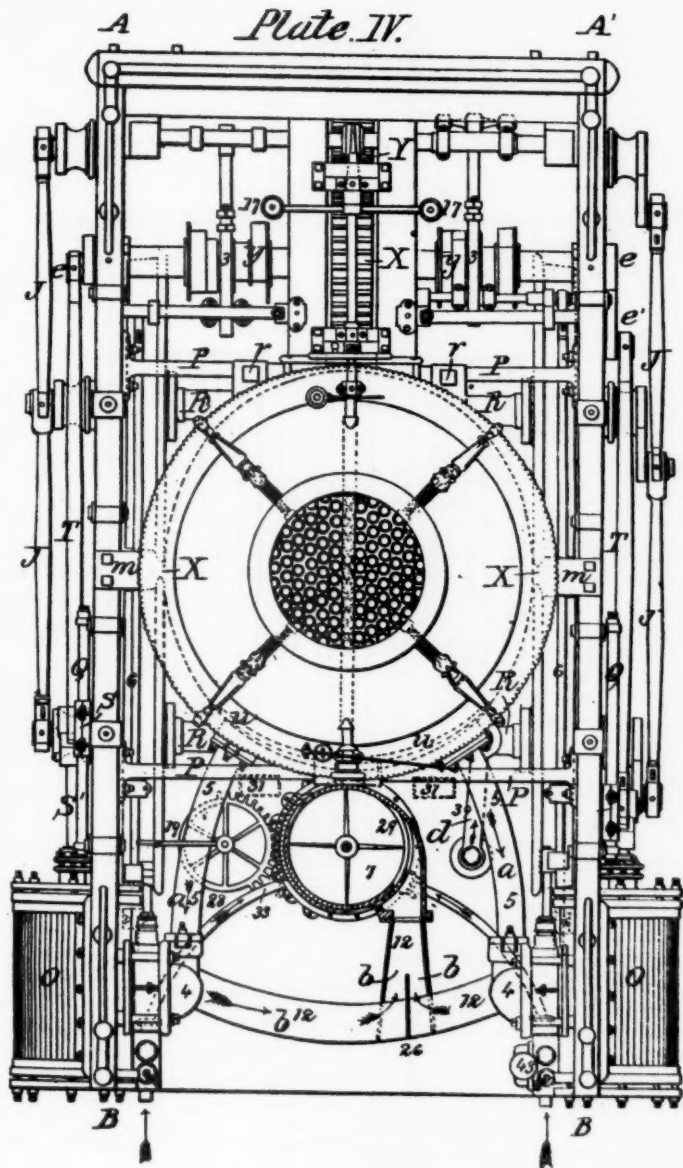
Side view of a Winan's "Crab."

Plate II.

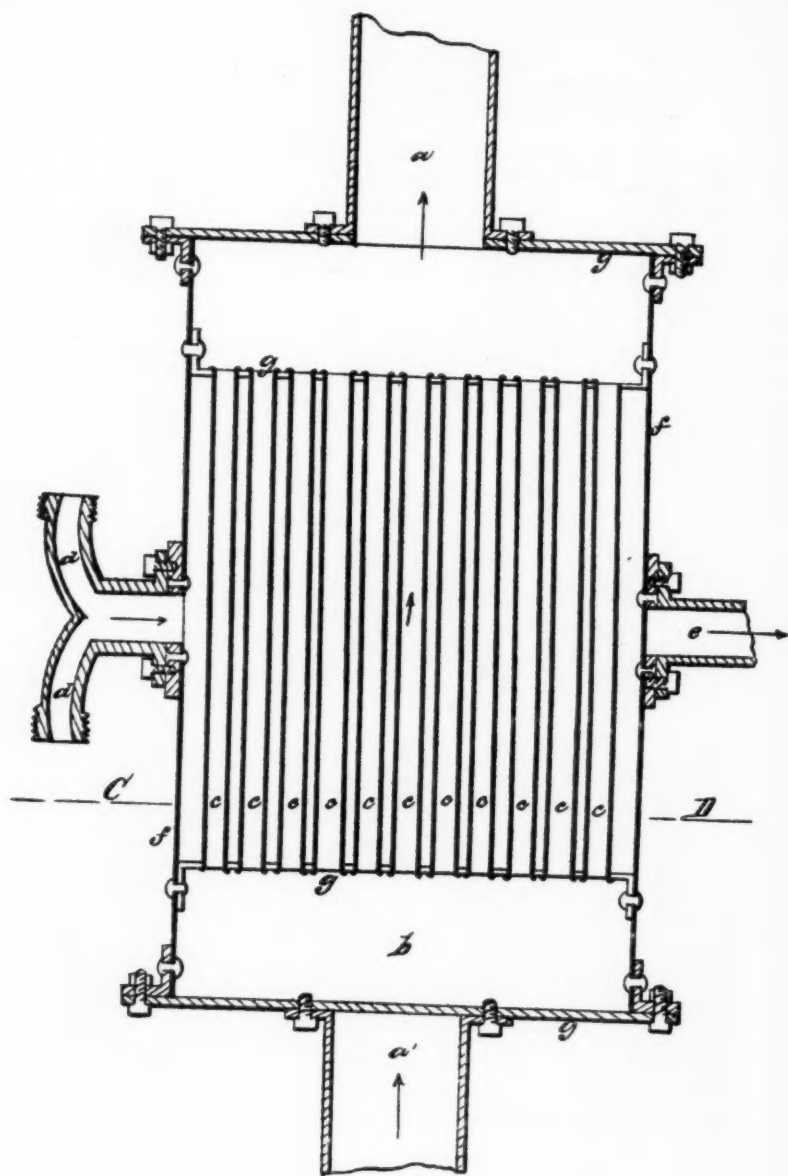


Front view of a Winan's "Crab."

A *Plate IV.* *A'*



Top view of a Winan's "Crab."



Winan's Feedwater Heater, 1837.

course, much higher than in the English engine, at a sacrifice of steadiness of motion, that was further sacrificed by the action of the pistons and other parts of the machinery having a reciprocating motion at right angles with the movement of the engine, and in the direction of the action of the springs, or nearly so, whereby a vibration upon the springs was produced that would cause the Baltimore engine to become at very high velocities alarmingly unsteady, so that indeed it would seem to bounce, rather than roll, along the rails."

Patent No. 308 describes a locomotive which was designed to eliminate the objectionable features of the "grasshoppers". The vertical boiler and short wheel base were retained, but the cylinders were placed horizontally, and the boiler was located midway between the two pairs of wheels. The pistons were directly connected to a spur-wheel shaft which was geared to a pinion-wheel shaft, and from the latter the wheels were driven through cranks and connecting rods. The overhanging cylinders at one end of the locomotive were balanced by the shafts and gearing at the other end, and with the centrally located boiler, the whole design was very symmetrical. The specification states: "The vertical boiler, the spur and pinion wheels, the third axle, the small wheels and the blowing apparatus of the Baltimore engine, together with their peculiar advantages, I preserve; but I combine with them, horizontal cylinders, with pistons moving parallel to the direction of the engine on the rails; and, by my arrangement for using horizontal cylinders and a lower position of the boiler, I put down the center of gravity of the entire machine as near the rails as in the horizontal English engine herein before described. It is for this combination, made by me for the first time, that I claim a patent". The claims were three in number.

When running, the appearance of these locomotives was most peculiar, because the spur shaft revolved in the opposite direction from the pinion shaft and the wheels. In consequence of this, the locomotives were nicknamed "crabs". They were fitted with a feed-water heater, which was covered by Winans Patent No. 309, granted July 29, 1837. The exhaust steam from the main cylinders, after driving a fan which furnished draft for the fire, passed through the heater, which operated on the same principle as the closed heaters used on many modern steam locomotives. An accompanying illustration reproduces the patent drawing. In the device as used by Winans, the exhaust steam passed through the tubes, and the feed-water filled the space surrounding them.

While the "grasshoppers" and "crabs" exerted no special influence on later locomotive design, they are of interest because of their many peculiar features, and because they met a definite need and were reasonably satisfactory in service.

Ross Winans started his career with the Baltimore & Ohio Railroad, and early established a locomotive building plant in Baltimore. He was a prolific inventor, and we shall shortly discuss other patents which were granted to him.

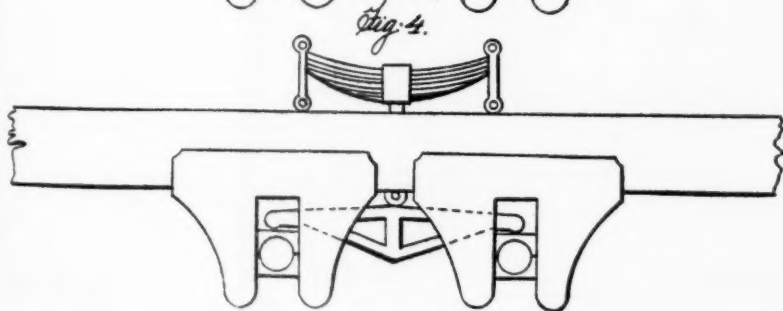
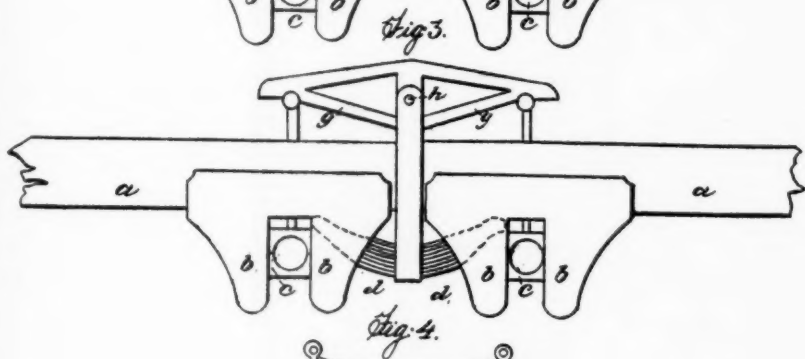
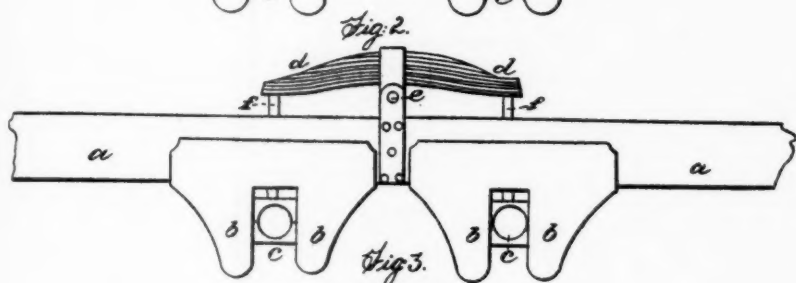
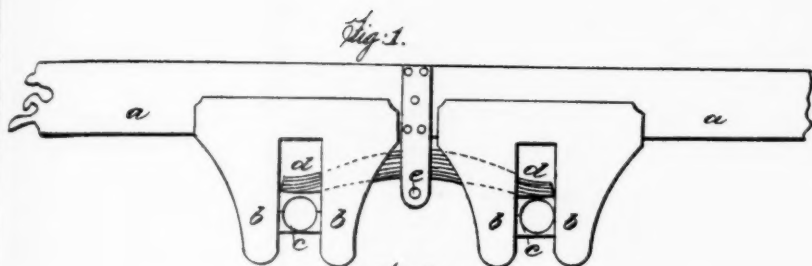
Patent No. 706, granted to Joseph Harrison, Jr., for "Improvement in Cars, Carriages, Trucks, &c., for Railroads", and dated April 24, 1838.

This patent describes one of the most important improvements ever made in locomotive design. The need for more powerful locomotives than those having only one pair of driving wheels early became evident, and Henry R. Campbell, Chief Engineer of the Philadelphia, Germantown & Norristown Railroad, in 1836 invented the 4-4-0 type, which with the same weight on each pair of driving wheels, had double the hauling capacity of the old single driver locomotives. But the frame of Campbell's new locomotive was supported at three points on each side, and the engine proved very rough riding on the uneven tracks then in use. The Harrison patent of 1838 disclosed a method of distributing the weight equally over several pairs of wheels, or to quote from the patent specification, "to effect a more equal bearing of the wheels upon the rails than has been heretofore attained". How this was to be accomplished is shown in the five accompanying drawings taken from the original patent. The exact arrangement of the "equalizing beam", as subsequently developed, is not disclosed, but the principle of supporting the frames at a point midway between adjacent axles is evident in each case. Fig. 3 shows the scheme used by Harrison on 4-4-0 type locomotives, and a practical application of this arrangement is to be seen in Peoples Ry. locomotive No. 3, which is on permanent exhibition at the Museum of The Franklin Institute in Philadelphia. Whether this locomotive was actually built by the firm of Eastwick and Harrison is open to doubt, but it is unquestionably one of the most interesting locomotive relics in existence.

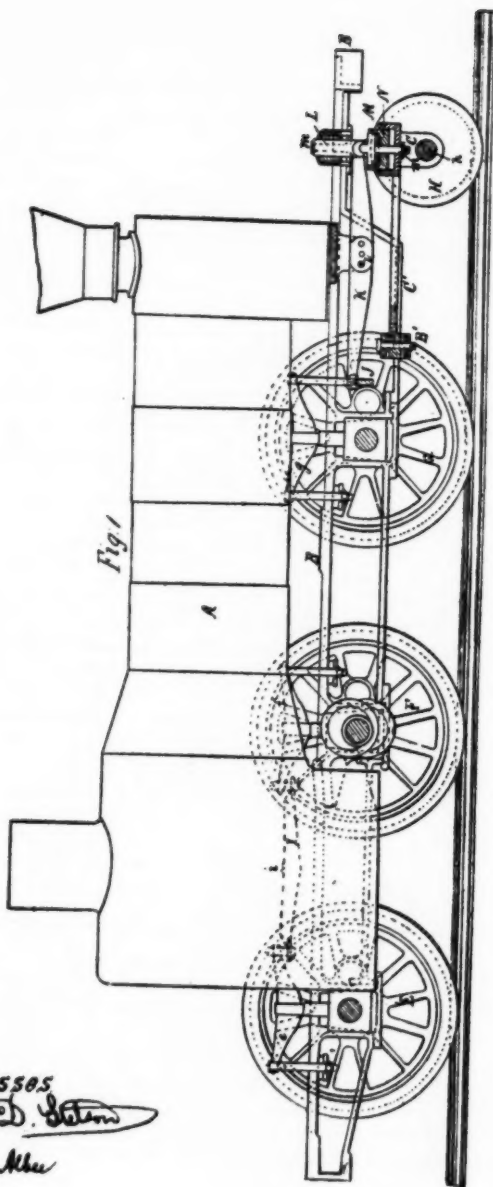
The Harrison Patent No. 706 also described a four-wheeled engine truck, so designed that the two parallel side frames might vibrate vertically, independently of one another. This, however, was of minor importance as compared to the equalizing system previously described, and the writer does not know whether it was ever actually used.

Joseph Harrison, Jr., started his career with the Norris Locomotive Works, and subsequently took employment with Messrs. Garrett and Eastwick, who were building steam engines and locomotives in Philadelphia. The firm later become know as Eastwick and Harrison. They were notably successful, and in 1844 transferred their activities to Russia, where they built locomotives and cars for the Russian railways. Harrison was one of the most notable mechanical engineers of his day. Had he accomplished nothing else, his invention of the equalizing beam would have brought him well-deserved recognition.

In connection with the Harrison patent, the Hudson patent No. 42,662, dated May 10, 1864, deserves notice. William S. Hudson was Superintendent of the Rogers Locomotive Works of Paterson, New Jersey, and he made a special study of locomotive running gear and

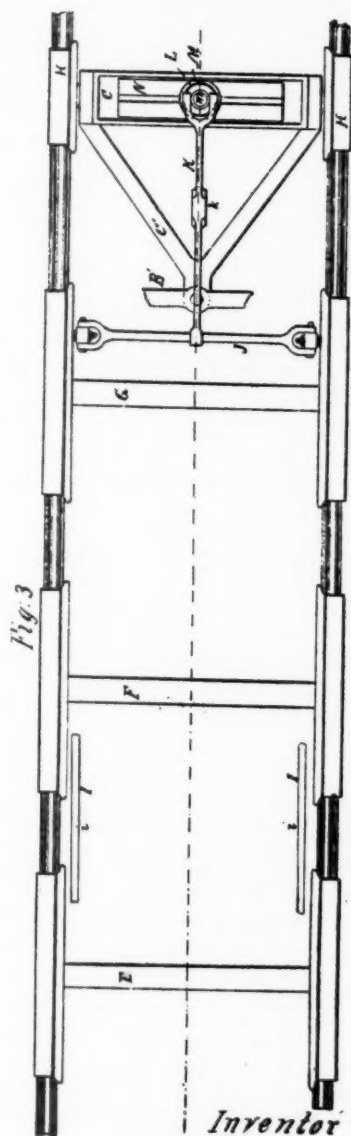


The Joseph Harrison, Jr. patent for Improved Car Truck



Witnesses
 Thomas D. Selden
 H. A. Allen

Inventor
 Hugh H. Hudson



Hudson's Patent for Equalizing Front Truck.

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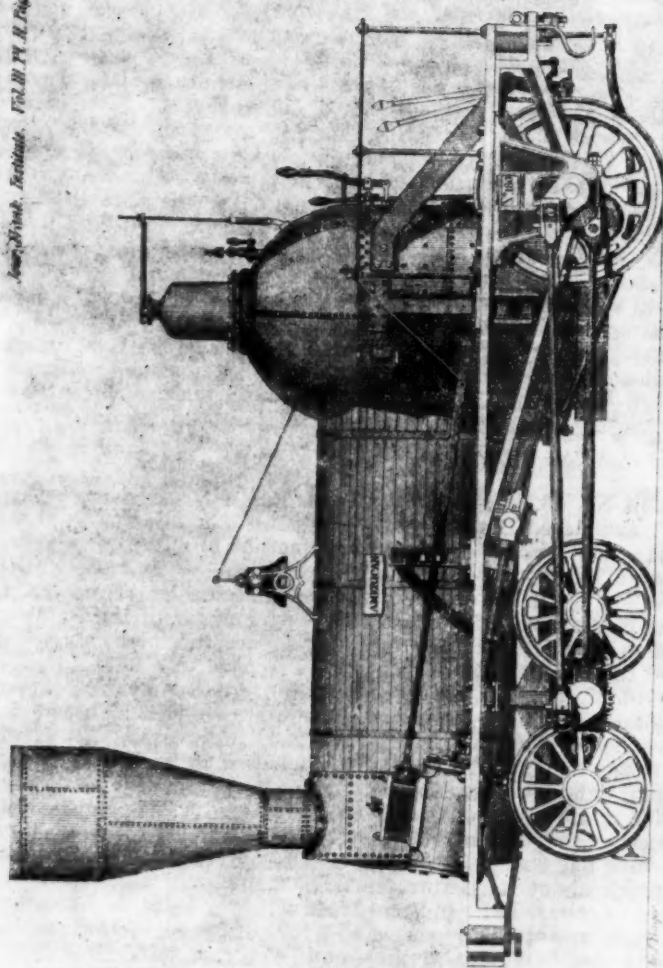
truck design. His patent No. 42,662 covered a method of equalizing the springs of the front drivers with those of a two-wheeled leading truck. Previous to that time, locomotives of the 2-6-0 type had been built, but the front truck was loaded directly through its center pin, and in passing over rough track the truck, at one instant, might be carrying very little load, and at the next instant be greatly overloaded. Hudson overcame this difficulty by placing a strong iron beam, with its fulcrum under the cylinder saddle, on the center line of the locomotive, and connecting the rear end of the beam with the springs of the leading drivers, and the front end with the leading truck. With such an arrangement, should the truck strike a high spot in the track, part of the excess weight thrown on the truck wheels would be transferred, through the beam, to the forward drivers. The wheels back of the leading drivers were independently equalized, and a three-point suspension system was thereby secured; the forward end of the engine being carried by the central beam, and the rear end by the equalizing system on each side. The first application of this system was apparently made by the Rogers Works to locomotives of the Mogul (2-6-0) type. Baldwin applied it to the famous locomotive "Consolidation", built for the Lehigh Valley in 1866, and its use on locomotives with two-wheeled leading trucks soon became practically universal.

3

Patent No. 1921, granted to M. W. Baldwin for "Locomotive-Engine", and dated December 31, 1840.

This patent discloses an ingenious method of gearing the truck wheels of a locomotive to the driving wheels, so that the entire weight of the engine would be available for adhesion. Since 1834, Matthias W. Baldwin of Philadelphia, Pa., founder of the Baldwin Locomotive Works, had been building a successful locomotive of the 4-2-0 type—a general design with which he was loath to part. It was evident, however, that locomotives of greater hauling capacity were needed, and to meet such a requirement Mr. Baldwin devised a scheme, disclosed in Patent 1921, for gearing the truck wheels to the drivers. This was accomplished by placing a transverse shaft midway between the truck wheels, and connecting it, by outside cranks and rods, with the driving axle. The transverse shaft was geared to the truck axles by an arrangement of spur gears, which had teeth of sufficient width to allow for the vibration of the truck about its center pin. The number of teeth in these gears had of course to be in accordance with the relative diameters of the truck and driving wheels to avoid slippage. A locomotive embodying this ingenious arrangement was completed in August, 1841, and was eventually sold to the Sugarloaf Coal Co. It weighed 30,000 pounds, and had cylinders 13 inches in diameter by 16 inches stroke. On a trial run on the Philadelphia & Reading Railroad it hauled a train weighing 590 tons from Reading to Philadelphia, a distance of 54 miles, in five hours and 22 minutes. This was con-

Low, Frank, Reheats. Vol. III, P. 11, Page 343.

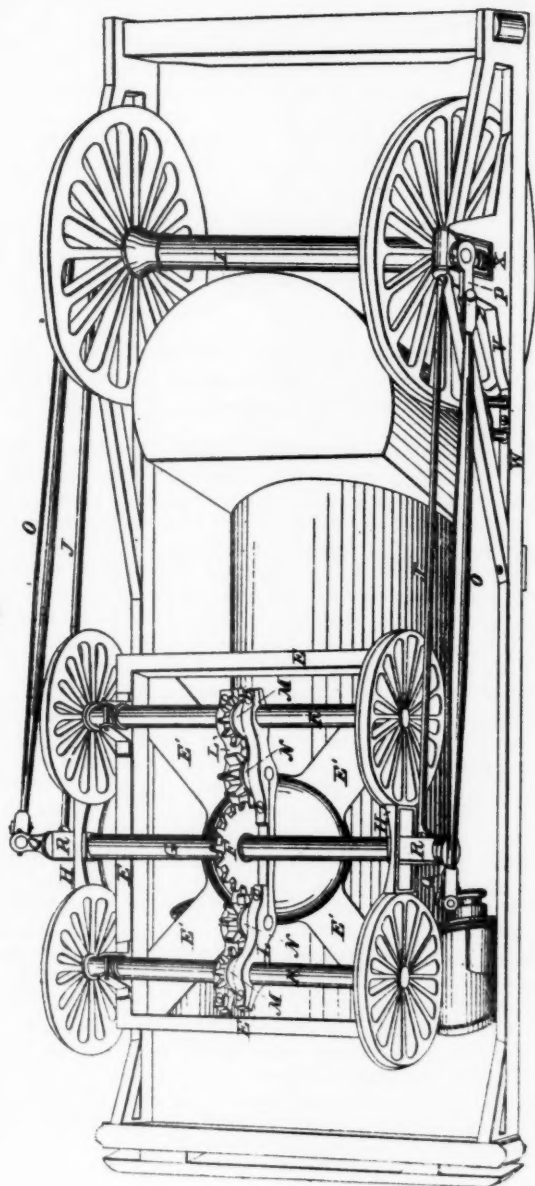


BALDWIN & VAIL'S ENGINE FOR BUHRER.

Mr. W. Baldwin's Geared Truck Locomotive for Freight Service—1842.

Courtesy Baldwin-Lima-Hamilton Corp.

Fig. 8.



Baldwin's Geared Locomotive.

sidered an astonishing performance, and Mr. Baldwin was hopeful that his geared design would be generally adopted; but there was no further demand for such engines and no more of them were built.

In addition to describing a geared truck locomotive, Patent 1921 also covers an arrangement of a fan for blowing the fire, and also a new form of packing, using metallic wire instead of "hemp, cotton, or other fibrous materials, hitherto used for that purpose—either around the stems of valves in stuffing boxes, or in other parts of the apparatus where stuffing is required". These devices, however, are not as interesting as the geared truck, which is illustrated by a perspective view of the underside of the locomotive, reproduced herewith, and also by a side elevation of the engine, as drawn by a certain Alfred Vail many years ago.

4

Patent No. 2759, granted to Matthias W. Baldwin for "Manner of Constructing Locomotive Steam-engines by Which They Adapt Themselves to the Curves and Undulations of the Road", and dated August 25, 1842.

This patent disclosed what later became known as the "flexible beam truck", by which means Mr. Baldwin was enabled to build coupled locomotives which could easily traverse sharp curves, and carried all their weight on the drivers. The arrangement was such that the first and second axles were always held parallel to each other, but they had a limited transverse movement, the first to the right and the second to the left, or vice versa. The crank pins were made spherical and the coupling rod brasses were bored to suit, thus giving the rods the needed flexibility. The idea was ingenious, and is said to have occurred to Mr. Baldwin during a sleepless night, while he was trying to scheme out a method for increasing the hauling capacity of his locomotives. The first engine of the new type was completed in December, 1842, for the Georgia Railroad. It had three pairs of wheels, all coupled, weighed 12 tons, and hauled, besides its own weight, 250 tons up a grade of 36 feet per mile. It was such a pronounced success that other orders for similar engines soon followed, and for some years the majority of the locomotives built by Baldwin were fitted with the flexible beam truck. The majority of these had three pairs of coupled wheels, but in 1846 the flexible beam truck was applied to a group of eight-coupled (0-8-0) engines built for the Philadelphia & Reading Railroad, and locomotives of generally similar design were subsequently built for the Pennsylvania and various other roads. Mr. Baldwin also built a passenger locomotive of the 2-4-0 type, with the leading wheels and the first pair of drivers combined in a flexible beam truck. He very soon, however, was practically compelled to adopt the 4-4-0 type for passenger service, but 0-6-0 and 0-8-0 type locomotives with the flexible truck were built for freight service up to the Civil War period, and their building was chiefly responsible for the foundation of the Baldwin fortune.

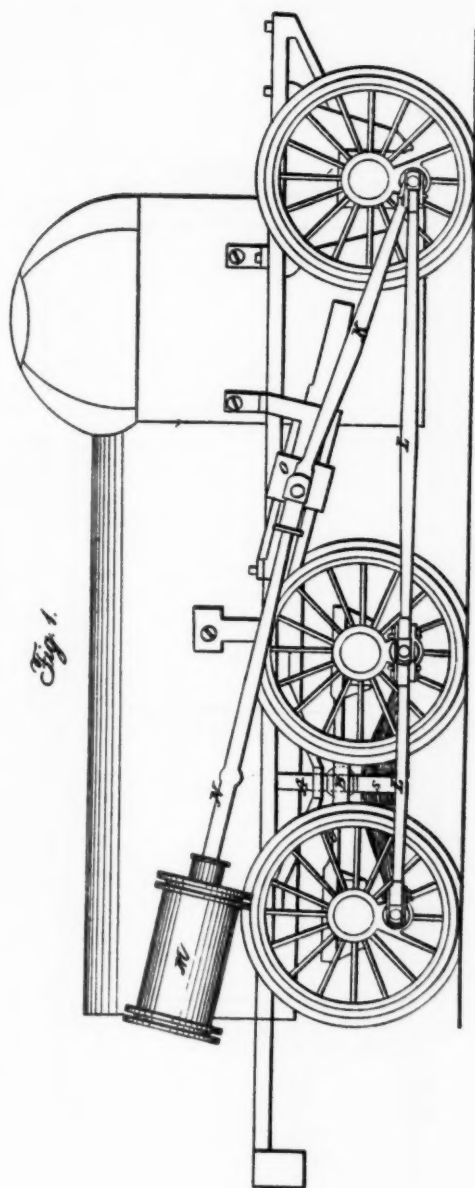
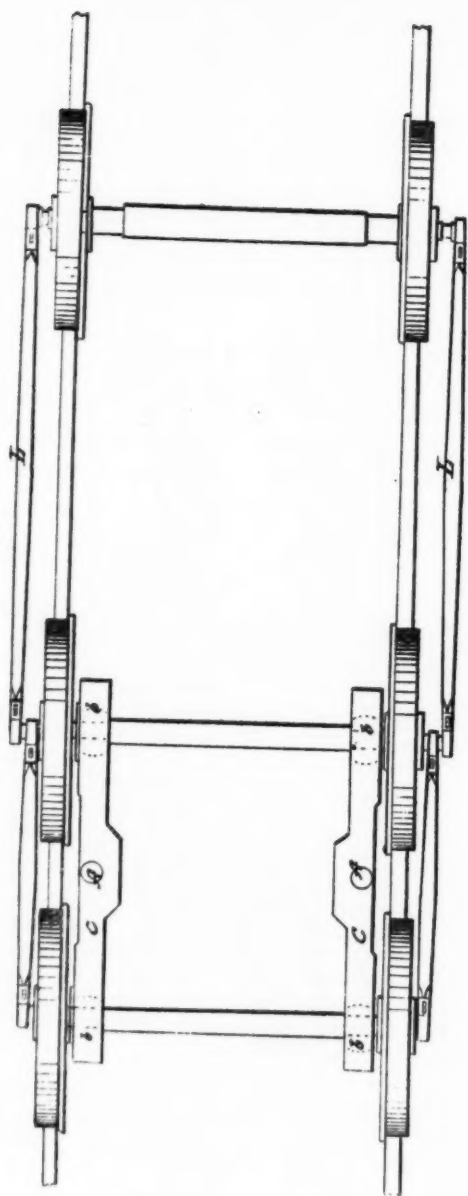


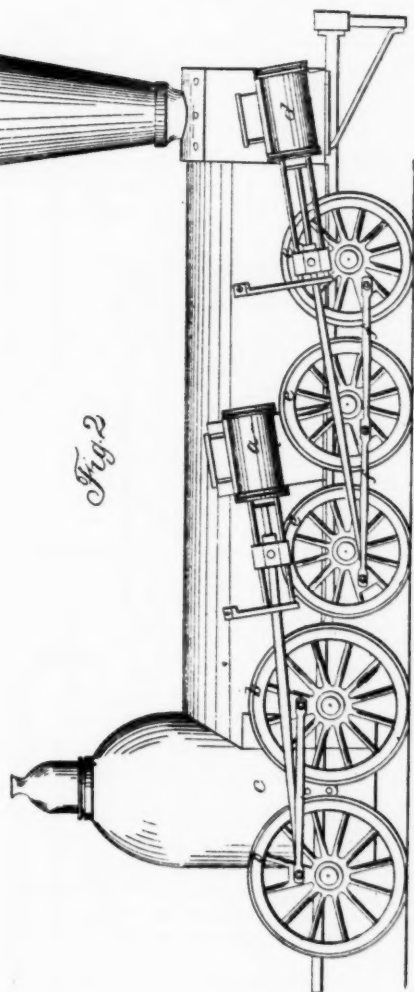
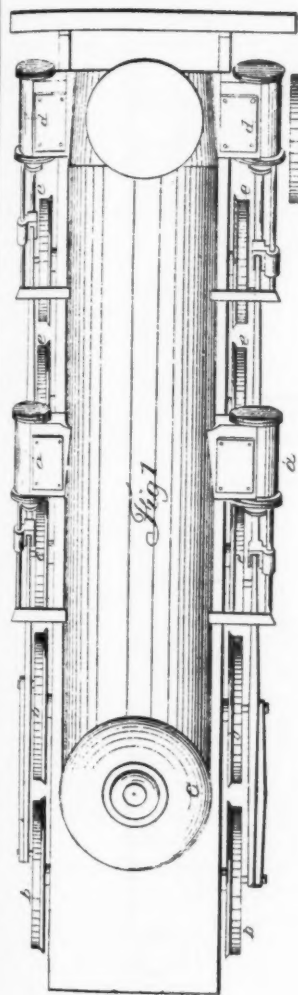
Fig. 1.

Baldwin's Flexible Beam Truck.

Fig. 2.



Baldwin's Flexible Beam Truck.



Nicholls' Improved Locomotive

Fig. 1.

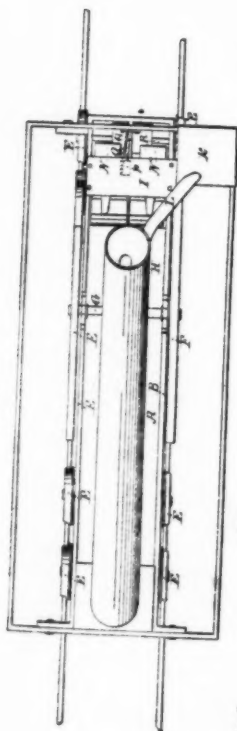


Fig. 2.

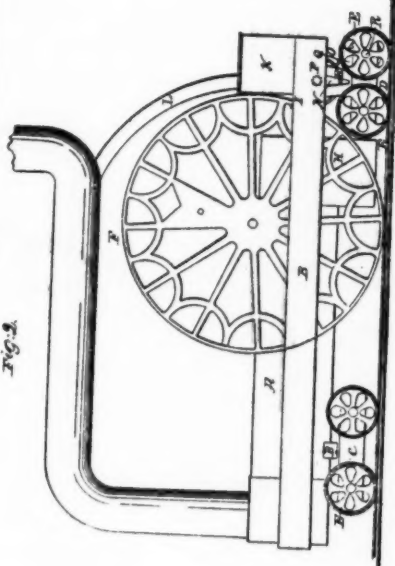
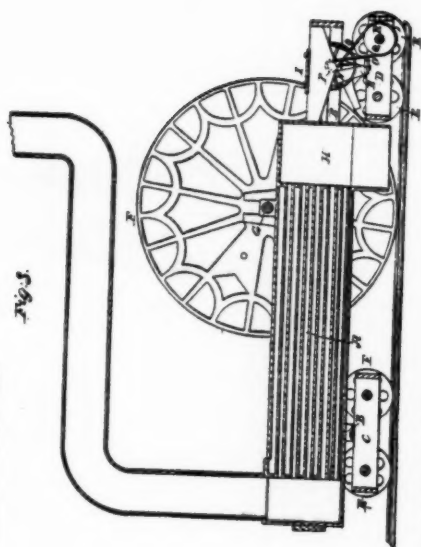


Fig. 3.



Emerson's Locomotive with Driving Axle above the Boiler.

Patent No. 5532, granted to G. A. Nicolls for "Improvement in Locomotives", and dated April 25, 1848.

This patent is noteworthy in view of the interest which developed a few years ago, in super-power locomotives having rigid frames, four cylinders, and two groups of driving wheels. Gustavus A. Nicolls was Superintendent of Transportation on the Philadelphia & Reading Railroad during the 1840's, and he was responsible for some astonishing creations, one of which—the "Novelty"—was actually built, embodying a locomotive with the engines and boiler carried on separate vehicles. Needless to say, it proved a sad failure.

The specification of Patent 5532 states that "As heretofore constructed, the locomotive steam-engine for railroads presents many very serious defects. When ascending grades, it requires more power than when descending them or running on levels, and yet from the nature of the general construction of locomotives, as the resistance increases its power decreases, and, therefore, instead of having an increase of power when ascending grades, it actually has less, from the fact that the increased resistance reduces the motion of the wheels, and consequently that of the pistons, and the power of the engine, being due to the pressure of the steam and the motion and area of the pistons, which latter represent the volumes of steam consumed in a given time, it follows that the slower the pistons move the less power the engine will give out". The patentee then states that his new design uses two groups of driving wheels, one comparatively large in diameter and the other preferably smaller, and each having its own pair of cylinders. To quote:—"By this arrangement, when the engine reaches moderate grades, the steam can be shifted from the engines of the large drivers to those of the small drivers. The difference in the diameter of the two sets will enable the pistons that operate the small drivers to work off all the steam generated in the boiler, and to exert the required force to draw the train up the grade, although with a reduced speed; and when ascending grades of greater inclination, both sets of engines and drivers may be brought into requisition, and thus the locomotive adapted to all the circumstances of the road, and rendered effective in carrying trains over the whole length of the road without waste of power."

It is of course evident, that the modern locomotives with divided drive were built to meet conditions very different from those which Nicolls had in view; but this old patent of 1848 plainly describes a locomotive with rigid frame, four cylinders, and two groups of driving wheels; and the specification states that "the two sets of drivers may be of the same size". There are two claims, reading as follows:—

1. The employment of an additional set of driving-wheels and engines, substantially as described, in combination with the usual driving-wheels and engines under any of the variations known or

of which they are susceptible, as described.

2. In this combination the use of small drivers for the additional set, substantially as described.

As far as is known, a locomotive as covered by this patent was never actually built.

6

Patent No. 6401, granted to Richard H. Emerson for "Locomotive with Driving-axle above the Boiler", and dated May 1, 1849.

This patent certainly discloses what may be described as a "freak" in every sense of the word. The locomotive is of the 4-2-4 type, intended for very high speed service. To effect this, the driving wheels are "about ten feet in diameter", and are "made either with or without flanches" (flanges). The location and arrangement of the cylinders and machinery is not specified. In order to keep the center of gravity as low as possible, the boiler is placed below the driving axle. The patentee is concerned lest "the engineman or person who controls the operations of the engine, and supplies it with fuel", be annoyed by smoke and sparks; hence he curves the "chimney" backward, and terminates it above the "platform" where the said "person" would be stationed. It is stated that "to a certain extent" the smoke annoyance "has been overcome by erecting a small cabin or hut over the platform, the said cabin being provided with windows in its front end, and so as to enable the engineman to see through them and ahead of the engine. By this means the evil above mentioned is but partially cured"—hence the amazing-looking chimney!

Attention is called to the "subtreasury box or receptacle for the sparks which do not pass out of the sparker or smoke pipe". This "receptacle" is placed at the rear end of the locomotive, and the sparks reach it through a pipe which extends downward from the second bend in the chimney. Draft is furnished by a blower, which is belt-driven from one of the rear truck axles. It is feared, however, that a locomotive built in accordance with this patent would prove an exceedingly "tight" steamer.

The patent carries one claim:—"The above described mode of arranging the boiler, the axle of the driving wheels, and truck frames of the supporting wheels, whereby I am enabled to produce an engine combining great speed and safety". Needless to say, no such locomotive was ever built—at least to the knowledge of the writer.

7

Patent No. 8571, granted to Ross Winans for "Running Gear of Locomotive", and dated December 2, 1851.

This patent is suggestive of that granted to Emerson (No. 6401) which has been discussed, and the locomotive described appears to be almost as freakish. But Winans was a keen inventor, and he had definite reasons—and sometimes they were very sensible

—for every device he brought out. Patent 8571 described a high-speed locomotive, specially designed to be as easy on the track and roadbed as possible. One-hundred years ago, the question of track maintenance was causing much concern; and wheel loads had to be strictly limited to suit light iron rails, mounted on a weak track structure and on flimsy bridges. Winans conceived the idea of building a locomotive in which the weight on the driving wheels would vary, being a maximum at starting, and a minimum when running at high speed. This he endeavored to accomplish by mounting a vertical steam cylinder above the driving axle on each side, and pushing down on the driving boxes when greater adhesion was required. By drawing steam for these cylinders from the pipe leading to the main propelling cylinders, the load on the drivers would be greater when starting with a full throttle. At higher speeds, when the throttle would be partly closed and the steam wire-drawn, the pressure in the adhesion cylinders would be reduced, relieving the drivers of a portion of the weight and transferring it to the trucks. Winans discusses this feature of his locomotive at considerable length; referring to the adhesion cylinders, he says:—

“By this arrangement the throttle valve, which is used for the purpose of regulating the pressure of steam admitted into the main or propelling cylinders of a locomotive engine, will also in a nearly corresponding degree regulate the pressure of steam in the adhesion cylinders. The plungers or pistons upon which the steam acts to obtain the requisite adhesion are to have such an area as, when acted upon by the maximum pressure of steam proposed to be used in the boiler, shall cause the wheels to be pressed down to the rails with a force which, when added to the weight of the wheels, axles, eccentrics, &c., will be equal to the greatest weight which it is proposed to apply on the drivers for the purpose of obtaining the adhesion upon which the tractive power of the engine depends. This being determined, the main or propelling cylinders are to be made of such capacity as shall with the maximum pressure of the steam render available the adhesion due to the maximum weight on the drivers, to the fullest practical intent. The following dimensions of the engine here represented it is believed will answer well in practice with a maximum pressure of steam of eighty pounds per square inch: Propelling cylinders, 17 inches diameter; stroke of piston, 22 inches; driving wheel, 7 feet diameter; pistons of adhesion cylinders, 11 inches diameter.”

Winans estimated that, with a pressure of 80 pounds per square inch in the adhesion cylinders, “the driving wheels will be pressed down to the rails with a force of 15,200 pounds. Add to this the weight of the wheels, axles, eccentrics, &c., 7300 pounds, and we have a weight on the drivers of 22,500 pounds, or 10 tons, which is perhaps as great a weight as should be admitted on a single pair of drivers, but which it is believed may be permitted and used with advantage under this arrangement, on a good, substantial road”. The patentee then demonstrates the weight on the drivers for

different steam pressures, until he reaches a minimum of 20 pounds, with a weight on the rails of 11,100 pounds. In each case the weight on the drivers would be sufficient to permit the corresponding tractive force to be developed.

The patent drawing shows, in outline, a 4-2-4 type locomotive, with driving wheels seven feet in diameter, and the rear truck under the firebox. The adhesion cylinders are supported on the boiler barrel, which is recessed on each side to make room for the vertical bars bearing on the tops of the driving boxes. The drawing shows two adhesion cylinders on each side, arranged tandem fashion one above the other, the upper one smaller than the lower. Winans applied the upper cylinders "in order that the objects here had in view may be carried out or realized to a still greater extent", and they could be used or not at the discretion of the engineman. Steam was admitted to them through separate pipes fitted with "stop cocks" which could be easily controlled.

Angus Sinclair states that Winans built a locomotive as described in this patent, but that it never did any useful work. This can readily be believed, as the arrangement was not practical. Years later, various designs of traction increasers were patented, based on the scheme of shifting the fulcrums of the rear equalizing beams on locomotives with trailing trucks; but they were used to only a very limited extent.

Apart from the unusual device which it discloses, this old Winans patent is particularly interesting because of its lengthy discussion of such subjects as adhesion, and the behavior of various types of springs. In the two claims of the patent, the adhesion cylinders and their allied parts are referred to as "steam springs"—which they really were.

8

Patent No. 10,901, Granted to Ross Winans and his son Thomas Winans, for "Locomotive Fire-Box", and dated May 9, 1854.

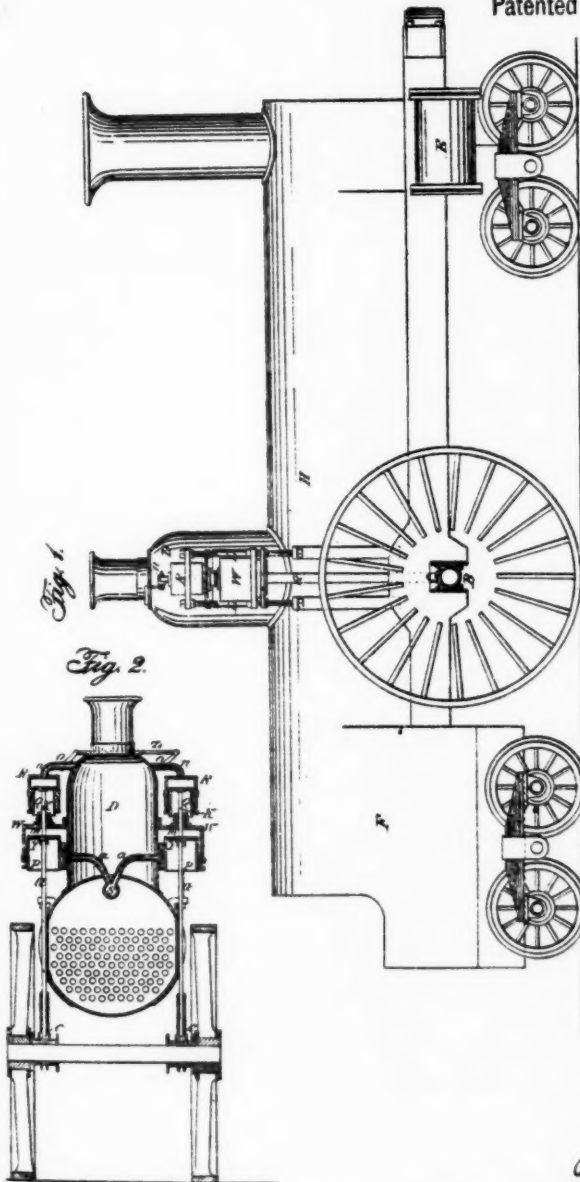
This was one of a number of patents granted to Ross Winans to cover the special features of his famous "Camel" engines, which were freight haulers of the 0-8-0 type. The first of these locomotives was built in 1848, and during the succeeding ten years Mr. Winans built them in considerable numbers for various railroads, and made a princely fortune in so doing. Records indicate that the Baltimore & Ohio had in service a total of 119—a larger number than any other road.

Winans realized that no locomotive could be a success without ample boiler capacity, and the Camels exemplified that idea. They were designed to burn coal, and had long fireboxes placed back of the rear driving axle. The engine frames were stopped in front of the firebox, which was as wide as the lateral distance between the wheels would permit. The result was a long overhang at the rear, and to reduce the weight the firebox was built with a sloping top, and the cab was placed forward over the boiler to insure a satis-

R. WINANS.
Locomotive.

8,571.

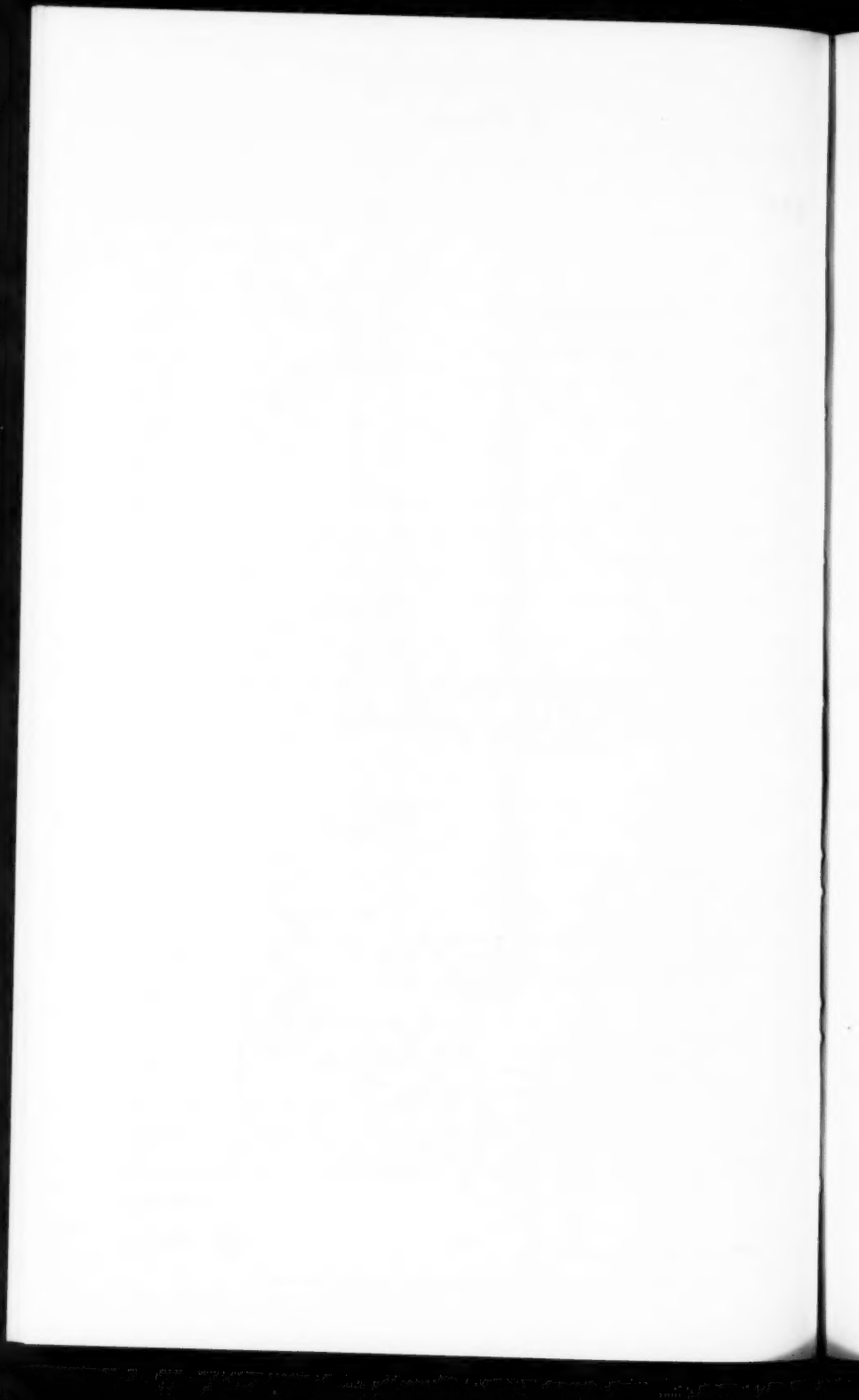
Patented Dec. 2, 1851.

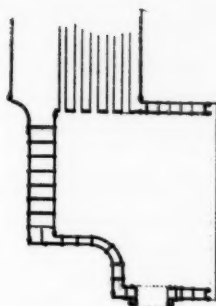
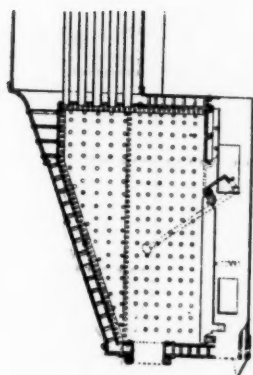
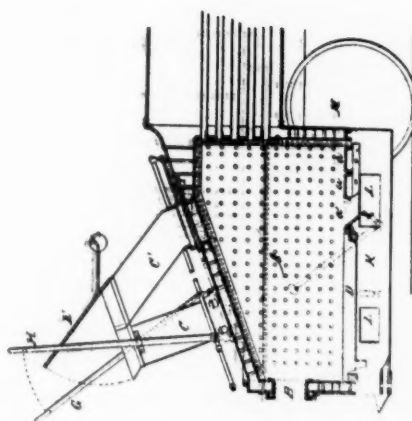


Inventor.

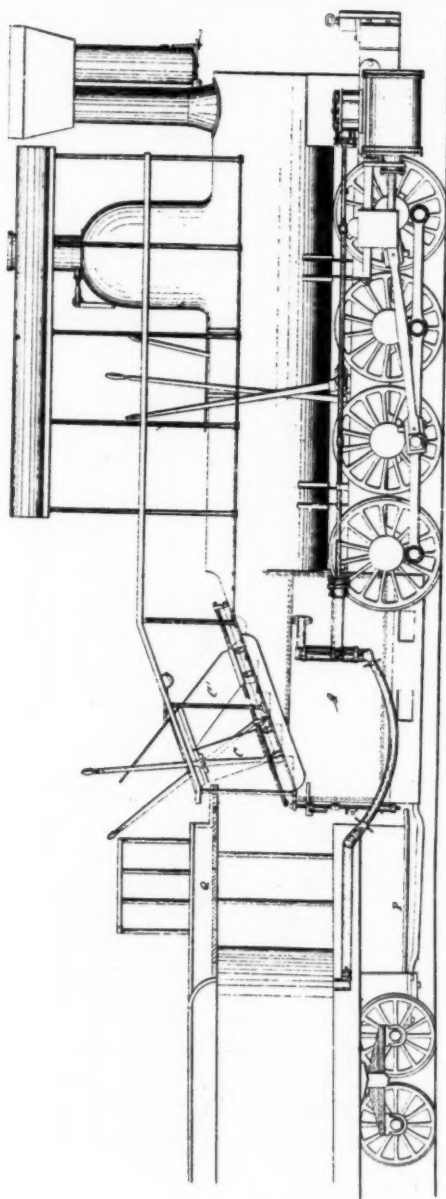
R. Winans

Winans's Locomotive Designed to be easy on Track and Roadbed.





Winan's Locomotive Fire-Box.



Winan's Locomotive Fire-Box.

factory weight distribution. The driving wheels were 43 inches in diameter, and were placed as close together as possible, on a wheel base of 11 feet 3 inches. The two middle pairs of drivers had tires without flanges.

Patent No. 10,901 presents an interesting discussion of the reasons for applying a large firebox and placing it in an overhanging position. Two "feed boxes" are shown, for distributing the fuel over the large grate area. They were fitted with slides operated by levers, so that they could be kept closed—except when dumping fuel on the grate. The tender was built with two floors, one above the other, the upper floor for the fireman to stand on while he was firing through the feed boxes, and the lower floor to be used while firing through the door in the back head. There was a drop grate in the front of the firebox, and, at least in the later engines, the grate bars, which were placed longitudinally, could be individually rocked in accordance with another Winans patent.

The general form of firebox described in this patent is of special interest in view of the extent to which it was later used by other designers. Millholland applied it to a large number of hard coal burners used on the Philadelphia & Reading Railroad; the Pennsylvania used it on their 2-8-0 type locomotives of Class H-1—old Class I—and 0-6-0 type switchers of Class B-3 (old Class M), and Stevens used it in modified form on heavy freight locomotives which he designed for the Central Pacific. Other examples could doubtless be cited, but these are sufficient to prove that the design had merit. On the Pennsylvania, such fireboxes were designated as the "Altoona type".

There was one claim in Patent 10,901. It read as follows:—"The downward and rearward inclination of the top or roof, when this is connected with the flat grate surface and the usual feeding hole or door, and with or without the fuel feeding boxes through the roof, as herein set forth".

One of the drawings shown with patent 10,901 gives an excellent idea of the appearance of a typical "Camel", and also shows the forward part of the tender, with its upper and lower platforms. As will be noted, the boiler feed-pumps were placed beside the firebox, and were worked by long rods connected to the crossheads. The feed-water was pumped into the side water legs. An interesting detail was the connection between the locomotive and tender. This was effected by a long drawbar, which was pinned, at its forward end, to the ash pan. The Winans standard stack, as shown, had a "dirt box" on top, with a spark-arresting device on its upper side, and a vertical pipe in which the arrested cinders and sparks were supposed to fall. The bottom of the pipe was hinged, so that it could be opened for cleaning purposes. A most original design of valve gear was used, with two eccentrics and one cam for each cylinder, permitting cut-off at either full stroke or half stroke. A conspicuous feature was a huge dome, placed well forward, which weakened the boiler on account of the large hole that had to be

cut in the boiler shell. The overhanging firebox strained the boiler severely at the rear end of the barrel, and boiler explosions were relatively frequent because of weak construction.

The Winans patents applying to the Camel locomotives afford an interesting subject for study, and give an excellent idea of some of the most troublesome problems which confronted the locomotive designer of a century ago. They overlap, to some extent, in that the same drawings are used in different patents, and the descriptive matter in two or three patents may be very similar. An excellent description of the Camels, together with interesting comments on some of the patents applying to them, will be found in the late J. Snowden Bell's book entitled "The Early Motive Power of the Baltimore & Ohio Railroad"—which volume has been freely consulted by the writer in preparing this article.

Appendix To Historical Sketch of the CENTRAL MILITARY TRACT RAILROAD

By A. W. NEWTON

In the early 1840's, two young men from New England, came to Detroit, Michigan, one, James F. Joy, a lawyer, and the other, James W. Brooks, an engineer. Contact between these two men soon resulted in an alliance that later proved to be of great value to both.

At this time Mr. John M. Forbes, a prominent financier of Boston, who had extensive connections among both New England and New York financiers, became actively interested in the development of the country west of the Alleghany Mountains. At that time the building of railroads, a new enterprise, seemed to him to be of more than passing importance in accelerating the growth of this territory. He even then visualized a possible railroad across the continent from coast to coast.

Soon after Joy and Brooks had established themselves in Detroit, they became interested in railroad financing, construction and operation.

The State of Michigan owned a railroad from Detroit, west to Kalamazoo, but like most state projects, it had proved a financial failure, and its sale was freely discussed.

Here, Joy and Brooks saw an opportunity, if financial aid could be obtained, which they well knew must come from the East. In 1846, Brooks went to Boston, contacted Mr. Forbes, who had known him when he was superintendent of the Buffalo and Rochester Railroad, and presented this railroad proposition in such a manner that Mr. Forbes became immediately interested. In fact, so much so that he, Forbes, made a special trip to Detroit to meet Mr. Joy.

The result was a coalition among these three men, the purchase of the railroad from the State of Michigan, its rehabilitation and eventual extension westward to Chicago, which was accomplished in 1852.

Joy eventually became noted, in legal and financial circles, as an outstanding authority on Railroad Law, and Brooks, besides being an engineer of great capability, developed into an efficient operating official.

About this time, Lieutenant John McPherson Berrian, who, according to Cullom's "Biographical Register of Officers and Graduates of U. S. Military Academy" (1868), had retired from the Army (1836) "located at Detroit and followed his profession, a civil engineer, principally on Michigan railroads." He became connected with John W. Brooks, and was later appointed Chief Engineer of the Central Military Tract Railroad.

And finally a man in the Far West, (Galesburg, Illinois), Mr. Chauncey S. Colton, who was interested in the building of the Central Military Tract Railroad, contributed largely to its financing and its ultimate construction, and eventually contributed much of his time and ability to this road and its successor, the Chicago, Burlington & Quincy Railroad.

To these five men, much of the early development and success of this road may be attributed. It seems, therefore, as an appendix to the historical article on the Central Military Tract Railroad, in which these men placed so active a part, that biographical sketches would not be amiss.

John Murray Forbes—1813-1898

A prominent Boston financier, well known to have been the controlling genius, in the development and building of the Burlington System. Reference is made to Pearson's "An American Railroad Builder" (1911) being the story of Mr. Forbes's life. Here may be found in well expressed language his biography and no attempt is here made to add to the contents of that publication.

James Frederick Joy—1810-1876

Born in 1810 at Durham, New Hampshire, where he grew to manhood. By 1836 he had graduated from Dartmouth College with degree of A.B., being class valedictorian. For a short time he was principal of the Pittsfield (N. H.) Academy, besides tutoring in Latin at Dartmouth. Attended law school in Harvard College 1834-35, and in 1836 was admitted to the bar of Massachusetts, as well as to the U. S. Courts.

In 1837 he went to Detroit, Michigan, where he established his home and where he resided until his death in 1876. Soon after his arrival in Detroit, he was admitted to the bar of Michigan, and formed a law partnership with Mr. George F. Porter, which became one of the most prominent law firms in the West.

The following is a biographical sketch of his life, and his important relationship in the development and growth of the Burlington System, prepared in 1937.

1810—Born December 3, 1810, at Durham, New Hampshire.

1833—Graduated from Dartmouth College in 1833 with degree of A.B. Was valedictorian of his class.

1834—Attended Harvard Law School.

1836—Admitted to the Bar of Massachusetts and U. S. Courts. Moved to Detroit, Michigan.

1837—Admitted to Michigan Bar. Formed law partnership with George F. Porter, which became one of the most noted law firms in the West.

1846—"Became interested in relief of the State from State owned and operated railroad which had become bankrupt." "Associated himself with a young civil engineer, John W. Brooks," who had during the Winter of 1845-46 contacted with John M. Forbes of Boston, and became interested in railroad

development in the West, that resulted in a trip to Detroit in 1846 to meet Mr. Joy.

The result was a coalition among the three men, Forbes, Brooks and Joy, the organization of the Michigan Central Railroad Co., the enactment of a law permitting this organization, the virtual rebuilding of the existing railroad from Detroit to Kalamazoo and its ultimate extension into Chicago, which was accomplished in 1852 (May 21).

During the period, 1849 to 1852, the Aurora Branch R. R., 12 miles in length, was built and operated by local interests. Mr. Forbes and his associates concluded that a western feeder for the Michigan Central Railroad was desirable, and became interested in the Aurora Branch, which under its new name the Chicago and Aurora Railroad Co., was planning an extension from Aurora to Mendota, Illinois, and aided in financing same.

1853—Mr. Joy's first connection with the Chicago and Aurora Railroad, predecessor of the Chicago, Burlington and Quincy Railroad Company, was in 1853 when he was elected director, a position which he held until Feb. 24, 1875, when his railroad activities ceased. He was president of the Chicago and Aurora Railroad from Feb. 22, 1853 to Feb. 21, 1855, when the name of the railroad was changed to the Chicago, Burlington and Quincy Railroad Co.

1855—Mr. Joy was president of this road from Feb. 21, 1855 to Jan. 12, 1857, during which time the Central Military Tract Railroad was built and placed in operation and consolidated with the Chicago, Burlington and Quincy Railroad Co. June 5, 1856. Later he was again President from July 12, 1865 to July 11, 1871.

In the "National Encyclopedia of American Biography", Vol. 18, printed in 1922, there appears an article on Mr. Joy's life in which, speaking of his activities it says: "Mr. Joy was counsel for the Company (Michigan Central Railroad) and managed all its legal business. This gradually demanded so much of his time that he was obliged to relinquish his law practice, and from his duties as lawyer and counsel of railway *companies* he was gradually drawn into their management, first as a director and then as president."

He was active in Michigan Central affairs from 1846, becoming its president in 1867 on the retirement of Mr. John W. Brooks from that position on account of ill-health.

1861—On August 24, 1861, Mr. Forbes, who had become active in national affairs, due to the outbreak of the Civil War, wrote to William Cullen Bryant, then editor of the New York Evening Post, recommending Mr. Joy for the position of Secretary of War. In that letter he expresses his views as to his character and ability as follows: "He would do well for the war, better for the interior, from his thorough knowledge of the West." "Lincoln, Trumbull, Chandler, and all western

men know him." "He is the most able and plucky man that I know."

- 1865—Mr. Joy was elected to the presidency of the Burlington and Missouri River Railroad (Iowa) in 1865 and held that position until 1869.
- 1866—In 1866, following the close of the Civil War, and when the Hannibal and St. Joseph Railroad became financially involved, Mr. Joy was elected to the directorate of the road as well as Chairman of the Board, which position he held until Nov. 6, 1871, when he retired, because of the control of the road passing from the Forbes interests to the Gould interests.
- 1867—July 11, 1867, on the organization of the Kansas City, St. Joseph and Council Bluffs R. R., Mr. Joy was one of the incorporators, and was named a director in the articles of incorporation.
- 1869—On April 2, 1869, Mr. Joy was elected president of the road and served in that capacity until November 4, 1874, when he tendered his resignation and was succeeded by Nathaniel Thayer.

During all these years, Mr. Joy as counsel and executive officer, together with James W. Brooks, an eminent engineer, acting under the direction of Mr. John M. Forbes, contributed largely to the development and success of the Burlington Railroad. Nowhere in the various records consulted was anything found to indicate other than the most friendly relations existing among these three men, with full confidence as to their respective capabilities.

Differences of opinion arose among them, which would naturally occur, as the following excerpt from a report of Mr. C. E. Perkins to the Boston interests regarding the proposed extension of the Burlington and Missouri R. R. west from Ottumwa, Ia., discloses:

"In August, 1866, I made my second trip across the State with James F. Joy of Detroit, then president of the Company. The end of the track was a few miles west of Chillicothe, say ten miles beyond Ottumwa, where we left the railroad and took a *carriage and pair*, with Peter G. Ballingal to drive. After six or seven days, stopping briefly at the County seats we landed at Plattsmouth. The result of this expedition was that Mr. Joy definitely decided against an extension to the Missouri River, and he doubted the wisdom of going even as far as Chariton. He told me that he did not believe a road through Counties of Clarke, Union, Adams, Montgomery and Mills could be made to pay in thirty years, and that he would advise his eastern friends not to take the risk of building. He acted on this conviction, and a year or so later resigned because his view did not prevail."

Notwithstanding the fact that his long experience as a successful railroad pioneer in Michigan and Illinois necessarily gave great weight to his opinion, the road was built,

because Messrs. Forbes and Brooks disagreed with him. (At the Directors meeting July 11, 1871, Mr. Joy declined reelection to the presidency of the C. B. & Q. R. R. Co.)

- 1871—Sept. 9, 1871, the Board (during the absence of Mr. Forbes) authorized certain traffic contracts, among which was one with the Chicago, Dubuque and Minnesota R. R.—one of the “River Roads”—that later because of developments forced Mr. Forbes to undertake a “good sifting” of C. B. & Q. management, and that finally resulted in his *coup d’etat* on Feb. 24, 1875, when Mr. Joy was defeated for re-election as director of the Company.

The story of this “railroad battle” as Mr. Forbes called it, is well told in Pearson’s “An American Railroad Builder” and need not be recorded in this memorandum other than to mention the outstanding features of same.

With the rapid growth of the Burlington, it was evident to Mr. Forbes that practices and policies adopted during the early development of the road should be changed. That differences of views between the Eastern financial interests and the Western operating interests existed, had been evident for some time. That the Board of Directors, in Mr. Forbes’ absence from the country, had made some most questionable decisions, that eventually seriously affected the Burlington, and in one case had appropriated funds from the treasury to the extent of over one million dollars to protect other enterprises, in which no less than six of the twelve members were personally interested. That due to the growth of the Burlington, extensive refinancing had become necessary, and could not be accomplished without a thorough reorganization of the Board.

- 1875—The climax of Mr. Forbes’ efforts to maintain the financial integrity of the Burlington, as well as the executive organization of the Company came during this year, when following a hurried trip West to investigate conditions, a meeting of bondholders of the “River Lines” held in Boston Feb. 17th because of the collapse of these enterprises, he made his memorable fight at the annual meeting of Burlington stockholders Feb. 24, 1875, for the “new ticket”—which as before stated resulted in the retirement of Mr. Joy from further activity in the Burlington.

Mr. Joy was undoubtedly a man of tremendous energy and varied affiliations in which railroading predominated. In a book entitled “Romance and Humor of the Road”, written by Stephen R. Smith of Galesburg, Ill., and printed in 1871, there is a chapter entitled “Miscellaneous Railroad Gossip” containing the following which to a certain extent indicates Mr. Joy’s activities:

“James F. Joy has had the active management for some years of the Michigan Central; Chicago, Burlington and Quincy Railroad; Burlington and Missouri River Railroad (Iowa); Hannibal and St. Joseph Railroad; Missouri

River, Fort Scott and Gulf Railroad; Leavenworth, Lawrence and Galveston Railroad, and other connecting lines, together with a partial direction of the New York Central Railroad and the Great Western Railroad of Canada. This immense business, now that the more western lines have been completed, he has designed to partially relinquish."

1871 saw the beginning of this relinquishment of business activities, which so far as the Burlington is concerned ended Feb. 28, 1875.

1876—His death occurred in Detroit, Sept. 24, 1876.

From the foregoing it can be concluded that Mr. Joy and certain of his associates failed in questions of administration of Burlington affairs to the extent that there finally occurred a "rift" between him and Mr. Forbes, that first resulted in his refusal in 1871 to be a candidate for re-election to the Presidency, and finally his defeat in 1875 for re-election as a Director.

No attempt has been made to recount the many activities of Mr. Joy other than references made in the foregoing sketch. From 1852 to 1857 he was Counsellor for the Illinois Central Railroad, then building from Cairo, Ill. to Galena, Ill., with a branch line to Chicago. His connection with the Michigan Central Railroad, from its acquisition in 1846 by the Forbes interests, until his death in 1876, as its Counsellor and on the retirement of Mr. Forbes in 1867, he was elected to the presidency of that road.

In closing, there is attached a copy of Mr. Joy's farewell address to the stockholders of the Burlington System, at the memorable meeting February 24, 1875, when he had been defeated for re-election as a member of the Board of Directors.

EXTRACT FROM MINUTES OF STOCKHOLDERS MEETING 2/24/1875

Mr. James F. Joy—

If there is no business before the meeting, I wish to say a word or two. This is probably the last time I shall meet with the stockholders of the Chicago, Burlington and Quincy Railroad. I recognize some of you, gentlemen, as those who have been associated with me in this road for a long time, when we worked hard together with a small subscription to begin to build this, which is now an immense enterprise. Yourself, Mr. Chairman, was one among them and one of the early subscribers and to my amazement you subscribed \$25,000 far down in the country for an enterprise such as you have never before engaged in; the encouragement which you gave us at Galesburg was what enabled us, after all, to carry this

Sources of Information:

National Encyclopedia of American Biography, 1923

Minutes of Stockholders and Directors Meetings of the various lines of the Burlington from 1853 to 1875

Pearson's "An American Railroad Builder", 1911

W. W. Baldwin's "The Making of the Burlington", 1920

Smith's "Romance and Humor of the Road", 1871

This memorandum is restricted to recorded facts, disregarding information that is mere hearsay or rumor. Conflicting records were encountered and in such cases the statements of men contemporary with Mr. Joy have been accepted as being most authentic.

enterprise through. You stood by us like men; you put in your money to the extent of your utmost ability—far more, in proportion to your means, than any man in New York or in New England; they put in their abundance, and small amounts of their abundance, but you, with your comparatively small means, gave all that it was in your power to give.

I recognize here the son of another of the pioneers of this Institution who worked with us early, who worked with us firmly, and who worked with us well; he has gone to his rest as many another man who began with us has.

Mr. Chairman (Mr. C. S. Colton), it is because these things are in my mind now as I am about to leave you that I wish to allude to them. For twenty five years we have worked together to build up this road and build up this Institution; we have succeeded under many difficulties, far beyond anything we had a right to expect or hope when we began; it has become large and prosperous, and an immensely profitable institution to the early parties who went into it. I am rejoiced, though I had to work hard for it,—I am rejoiced that the parties who went early into it made money out of it. I am rejoiced that they have continued to hold their stock and their bonds until they realized its full value. I can only speak of the pleasantness of the associations that have existed between us for many years, I being the President of the Road, always supported—always well supported, and cheerfully, and until recently never with a dissenting voice in the Board or in the stock. Recently it has been changed, it may be for the better, I do not say it is not; I hope it will be for the better. I shall rejoice to see the Road go along and prosper under the comparatively new administration as well as it has done under the old. No man will rejoice as much as I. I see no reason why it should not, and I believe that it will, and if it continues to prosper, although I shall be dissevered from any connection with it, I shall as much rejoice as I have while it has been comparatively under my care.

With these remarks, Mr. Chairman, I wish you all prosperity in the future, and feeling that I shall never meet with you again, I bid you farewell.

Mr. Harding—

Mr. Chairman, I move the adoption of the following resolution:

Resolved: that the Stockholders of the C. B. & Q. R. R. desire to express their undiminished regard, and thanks for the past services of Mr. James F. Joy and Mr. J. A. Burnham, retiring members of their late board of direction.

Mr. Griswold seconded the motion and it was carried unanimously.

John Woods Brooks—1818-1881

In 1937, at the request of Mr. Ralph Budd, president of Burlington Lines System, a chronological biography of Mr. Brooks was prepared to which can be added. It is herewith quoted in full.

"Mr. Ralph Budd:

In regard to your request for historical information concerning Mr. John Woods Brooks—for many years an active factor in shaping and carrying out the building of the Burlington.

From various sources, principally the Secretary's record of proceedings at Stockholders' meetings and Directors' meetings, there has been prepared as complete a record of his activities as these records disclose.

The following is a brief summary based on this memorandum:
Aurora Branch R. R.—organized 1849

Director Feb. 22, 1852, until name of road was changed to Chicago and Aurora R. R. June 22, 1852.

Chicago and Aurora R. R.—organized 1852

Director June 22, 1852, until name of road was changed to C. B. & Q. R. R. Feb. 21, 1855.

Central Military Tract R. R.—organized 1851

Director Oct. 14, 1852 to date of consolidation with C. B. & Q. R. R. July 5, 1856. President during the same period.

Chicago, Burlington and Quincy R. R.—organized July 5, 1856.

Director continuously from July 9, 1856 until his retirement March 2, 1876 on account of ill health.

Burlington and Missouri River R. R. (Iowa)—organized 1852.

Director from date of organization until acquisition by purchase by the C. B. & Q. R. R. July 31, 1875. President in 1853 and again in 1854. In 1863 again elected President and served continuously until his retirement July 2, 1875, excepting the year 1865, when James F. Joy was its President.

Burlington and Missouri River R. R. (Nebraska)—organized 1869.

Director from date of organization in 1869 until his retirement March 2, 1876, because of ill health. President of this road from Nov. 11, 1869 until his retirement March 2, 1876.

Hannibal and St. Joseph R. R.

Kansas City, St. Joseph and Council Bluffs R. R.

On these two lines, which later were acquired by the Burlington, he served variously as Director, Chairman of the Board of Directors, and President.

Mr. Brooks died September 16, 1881, at Heidelberg, Germany.

(Signed) A. W. Newton

MEMORANDUM—John Woods Brooks, born 1818; died 1881.

1836-7—Educated for civil engineering profession by Loami Baldwin of Boston, Mass. Not a graduate engineer.

1839—Chief Engineer, Boston & Maine R. R.

1845—Superintendent of Auburn & Rochester Railroad in New

Note—Chicago, Burlington & Quincy Rail Road Co., consolidated with Peoria and Burlington Rail Road Co. under the name of Chicago, Burlington & Quincy Railroad Co. June 24, 1864 (the present company).

York. It was at this time he first met John M. Forbes, a financier in Boston, who later became a directing genius of the C. B. & Q. R. R.

1846—Became the Chief Operating Officer of the Michigan Central R. R., of which Mr. Forbes was President. Continued in this capacity until December, 1855, when, on the retirement of Mr. Forbes, he was elected to the presidency of the road and established his residence in Boston. He held this position until 1867.

1852—At the annual stockholders meeting of the Aurora Branch R. R., Feb. 22, 1852, Mr. Brooks was elected a director. This was his first appearance in the affairs of the railroad that later (1855) became the C. B. & Q. R. R.

From the organization of the Aurora Branch R. R. in 1849 to 1851, its Chief Engineer was Mr. J. L. Hanchett, and from 1851 to February, 1853, its Chief Engineer was Mr. G. W. Waite. Mention is made of the above, because of a general opinion that has long existed, that Mr. Brooks was Chief Engineer of the Burlington (then the Chicago and Aurora Railroad) during the years 1852 and 1853.

1852—At a meeting of the stockholders of the Central Military Tract Railroad, October 14th, a board of thirteen directors was elected consisting of "J. W. Brooks, Henry Ledyard, J. F. Joy, and G. V. Lathrop, of Detroit; I. H. Burch, C. G. Hammond, and John H. Kinzie, of Chicago; Chauncey S. Colton, W. Seldon Gale, James Berrien, and Silas Willard of Galesburg, Illinois; William McMurtry, of Henderson; and John M. Bryant, of Princeton."

These directors then elected "Mr. Brooks, president; J. M. Berrien, Chief Engineer; and David Sanborn, of Galesburg, Secretary.

Mr. Brooks continued as President of the Central Military Tract Railroad throughout its construction and operation until its consolidation with the C. B. & Q. R. R. Co. in 1856. Besides being Chief Operating Officer (Superintendent) of the Michigan Central, he was at this time a director of the Chicago and Aurora R. R., a director of the Central Military Tract R. R. as well as its President.

1853—The Burlington and Missouri River Railroad was organized in 1852, and July 2, 1853, Mr. Brooks was elected its President, and again in 1854. He was again elected in 1863, and with the exception of 1865, when James F. Joy was President, he served continuously in this capacity until July 2, 1875, when at a regular meeting of the directors he tendered his resignation because of ill health.

1854—In addition to the many responsibilities placed on Mr. Brooks by Mr. Forbes, such as Superintendent (the highest position except that of President) of the Michigan Central R. R., a director of the Chicago and Aurora R. R., and President and Director of the Central Military Tract Railroad, he was put in charge of the completion of the Sault

Ste. Marie Canal, which was accomplished in record time under most adverse circumstances. In December of that year Mr. Forbes wrote: "He is a perfect Napoleon in his way—with 1500 men of the roughest sort in the wilderness, nobody to lean on, the Cholera raging around him, and the work of two years to be driven through in six months. He lost more than a tenth part of his force by Cholera, but by dint of *will* he has got the canal so far on that it can be done amply within the time required."

- 1855—On the retirement of Mr. John M. Forbes as President of the Michigan Central Railroad, Mr. Brooks was elected to succeed him, and in 1857 moved from Detroit to Boston, where he established his headquarters and office. At a meeting of the Directors of the C. B. & Q. R. R. in his office in Boston, June 12, 1857, it was: "Voted—That the directors meet until further notice, on the first tuesday of each month at ten o'clock in the forenoon in the office of J. W. Brooks in Boston."

The record of the Secretary shows that from this date until the date of his retirement he was almost invariably present at these meetings, and he therefore must have spent most of his time in Boston, even though he held at different times the office of President of lines that later became a part of the CB&Q system.

- 1858—Mr. Forbes had become interested in the Hannibal and St. Joseph Railroad—then under construction, but because of the panic of 1857 had fallen into financial difficulties, besides having to deal with a contractor, "a self-made man, shrewd, hard and rich"—"the very type of railroad contractor" who wished to build a "cheap contractor's road to sell." Mr. Forbes was determined to have "a solid one, adapted to being *held* and *used* for business purposes" all of which resulted in Mr. Brooks entering the picture. Bonds to the amount of \$1,500,000 were sold at 60, "and under the *strong management which he had provided, with John W. Brooks at the head*", Mr. Forbes concluded the road could now be left to take care of itself, and early in 1859 it was successfully completed to the Missouri River—ten years prior to completion of the B&M in Iowa (Nov. 15, 1869).

Records of the secretary of the Hannibal and St. Joseph R. R. disclose that Mr. Brooks was appointed Umpire in 1856 to settle differences between the Chief Engineer, Josiah Hunt, and the Contractor, John Duff. He negotiated an agreement, but it appears that a short time later it was concluded to discharge Duff.

Elected Director first in 1857 and continued as such until 1871. For the greater part of this time he was Chairman of the Board, being succeeded in 1866 by James F. Joy.

As a matter of historical interest, in 1859 Mr. Brooks filed the city plat of Brookfield, Missouri, which was named after him and three streets bear his name: John, Woods and Brooks.

1869—Mr. Brooks was elected to the Presidency of the B&M in Neb. at the time of its organization in 1869 and served in that capacity until, because of ill health, he tendered his resignation March 2, 1876.

To the value of Mr. Brooks' work, Mr. Forbes was never weary of bearing witness, both as to management and engineering ability. In 1852 Mr. Forbes wrote, "The more I see of the difficulty of getting good managers for other roads and other large things, the more I am satisfied with Brooks—. In fact, if we could have the best railroad president and the best superintendent, *each* picked among all the railroad companies here, I think Brooks would be worth the *two*."

In 1854, after Mr. Forbes had placed another heavy responsibility on Mr. Brooks—that of completing the Sault Ste. Marie Canal, he wrote: "He is a perfect Napoleon in his way." In 1858, when Mr. Forbes had placed Mr. Brooks in charge of completion of the Hannibal & St. Joseph R. R., he wrote: "and under the *strong management* which he provided, with John W. Brooks at the head—the road could now be left to take care of itself."

While Mr. Brooks in connection with his many other responsibilities, apparently directed the engineering activities on the roads of which he was an executive officer, the records of the Burlington do not disclose that he, at any time, bore the title of Chief Engineer. Nor is there anything in Pearson's "An American Railroad Builder" or Mrs. Hughes' "Life of John Murray Forbes" to indicate that such was the case. Following his death there appeared in the Railroad Gazette of Sept. 23, 1881 a biographical sketch of his life, but no mention is made of his being Chief Engineer of the Burlington.

It is evident all through Burlington records that he was an active agency in engineering matters pertaining to its construction and operation, and it may therefore be concluded that he filled a position of Consulting or Directing Engineer, without the title other than that of Director of the railroad, or President of certain lines that later became a part of the Burlington.

John McPherson Berrien
1803-1876

Likewise in 1937 at request of Mr. Budd, a chronological biography of Mr. Berrien was prepared which is herewith quoted. Information for this sketch came largely from the "Burton Historical Collection" in the Detroit Public Library. Other information also obtained from the "Historical Register and Dictionary of the Army", as well as Cullom's "Biographical Register of Officers and Graduates of U. S. Military Academy."

During the time he was Chief Engineer of the Central Military Tract Railroad, the Chicago and Aurora Railroad was without a Chief Engineer, and it is a pretty well established fact that he had charge of Engineering matters on that road, as all the buildings on both railroads were erected during that time, and were of similar types of construction.

During the latter part of his service, with the railroad, he maintained his office in Chicago, where the general offices were located, and records show that he not only was Chief Engineer of the Central Military Tract Railroad, but performed many services over the entire line from Chicago west.

MEMORANDUM—John McPherson Berrien—1803-1876

1803—Born in New Jersey

1822—Entered West Point Military Academy, July 1, 1822

1826—Graduated West Point Military Academy July 1, 1826

Brevetted Second Lieut. 2nd Infantry, July 2, 1826

Second Lieutenant 5th Infantry, July 5, 1826

Served in Military Academy 1826 to 1828 as Asst. Teacher of Drawings and Instructor of Infantry Tactics. On Topographical duty 1828 to 1836. Resigned from Army Dec. 31, 1836.

1834—St. Joseph, Michigan Harbor surveyed by Lieuts. *Berrien* and *Rose*. Also made preliminary survey of Detroit and St. Joseph R. R. which later became the Michigan Central R. R.

Detached from Engineering Corps for Civil Service in connection with railroad construction. This was only a few months prior to his resignation from U. S. Army.

1836—"In July, 1836, Mr. Berrien was elected Chief Engineer of the Detroit and St. Joseph R. R., the construction and equipping of which was entrusted to him." He continued in this capacity along with other engineering activities until the road was acquired by the Forbes' interests in 1846 at which time the road name was changed to the Michigan Central R. R. with Mr. John M. Forbes as President.

1837—"The State of Michigan acquired the Detroit and St. Joseph R. R." which later (1846) was purchased by the Forbes' interests.

1841—For a period of six years, he resided at Jackson, Mich.—this residence doubtless was in connection with the Board of Internal Improvements appointed by the Governor at the time of acquisition of the Detroit and St. Joseph R. R. as

records disclose that for a time, at least, he was Secretary *pro Tempore* of this Commission, which had charge of this railroad.

Cullom's "Biographical Register of Officers and Graduates of U. S. Military Academy", printed in 1868, says that "following his retirement from the Army (1836) he located at Detroit and followed his profession, a civil engineer, principally on Michigan railroads."

At Detroit he came in contact with Mr. John W. Brooks, who was connected with the Michigan Central R. R.—successor to the Detroit and St. Joseph R. R.

1852—He came to Galesburg, Ill. with Mr. Brooks and was elected Director and Chief Engineer of the Central Military Tract Railroad, Oct. 14, 1852, continuing in that capacity until 1854.

1856—On his return to Detroit he was elected Chief Engineer of the Michigan Central Railroad serving in that capacity fourteen years.

1870-76—He continued his residence in Detroit, but did not engage in engineering activities. The Detroit Daily Post of Oct. 13, 1876, in announcing his death said:

"Col. Berrien (probably an honorary title as he was First Lieutenant at the time of his retirement from the Army) was a descendant of the well known and highly respected family of that name, which removed from New Jersey to Georgia in 1871, where John McP. Berrien, uncle of the deceased, was born, and where he held so many offices of public trust and responsibility, being elected three different terms in the U. S. Senate and occupying the seat of Attorney General in President Jackson's Cabinet."

Speaking of his qualifications this paper further stated:

"Many of the finest structures in this portion of the country were superintended in their construction by him, among them, St. Paul's Church."

The Detroit Tribune of Oct. 13, 1876, in its obituary notice said:

"He had a widespread acquaintance, however, among railroad men, and was looked upon as one of the most skillful engineers in the country."

The sources of information from which the above memorandum was prepared are:

- (1) Cullom's "Biographical Register of Officers and Graduates of U. S. Military Academy", published in 1868.
- (2) Burton Historical Collection, Detroit Public Library.
- (3) Chapman's "History of Knox County, Ill.", published in 1878.

Chauncey Sill Colton—1800-1885

Of the men active, not only in the building of the Central Military Tract Railroad, but also in the development of the Burlington System, Mr. Colton because of his long period of service with the road (1853 to 1875) deserves more than passing mention.

Born in Springfield, Penn., September 21, 1800, he with his parents moved to Monson, Mass., shortly thereafter, where he was educated. In the early 1830's he came West, finally settling in Galesburg, Illinois, where he built the first store building and in which he dealt in general merchandise, under the firm name of C. S. Colton and Sons.

He was an active participant in the development and growth of Galesburg. He was a director in the First National Bank of that city; was one of the organizers of the Farmers and Mechanics Bank, serving as its first president; was a trustee of Knox College; assisted in the founding and growth of the Congregational Church; and was for many years a Director of the Chicago, Burlington and Quincy Railroad Co. It is of these years of service with that road that most concerns one in preparation of this biographical sketch.

Galesburg's growth between the years 1833 and 1853, together with the rapid extension of the railroad industry, and the rapid growth of farming interests, created a demand for rail facilities for shipment of farm products to available markets, as well as to provide a way to haul merchandise into that territory.

He was one of a committee that went to Springfield, Ill., February 15, 1851, and procured an Act of Legislature authorizing the construction of the Central Military Tract Railroad.

In 1852, while on a trip East to purchase goods for his store, he with two other men, also interested in railroad construction in Illinois, contacted Mr. John M. Forbes of Boston, in regard to financing this project. This resulted in necessary financial aid that assured the building of this line. He was also influential in securing a change of route of the Peoria and Oquawka R. R., so that it would pass through Galesburg, instead of five miles south as originally proposed. A short time later (1852) he, together with Mr. Jas. W. Bunce, another director of the Central Military Tract Railroad, went to Quincy and negotiated an agreement with the Northern Cross Railroad, by which its line would terminate at a connection with the Central Military Tract Railroad at Galesburg, instead of building on eastward to the Illinois River.

The importance of these two changes, rests in the fact that through them the two roads became assured of financial aid; that the Forbes interests were later to acquire them for inclusion in the general plan for a line from Chicago to Burlington and Quincy; and finally the avoiding of competing and parallel lines.

In October, 1852, Mr. Colton subscribed for \$25,000 worth of stock in the Central Military Tract Railroad—about which Mr. Joy, years after (1875) when he was retiring from activity in the Burlington, paid Mr. Colton a high compliment, during his farewell address which is herewith quoted:

"You, yourself, Mr. Chairman (Colton) was one of the early subscribers, and to my amazement you subscribed \$25,000, far down in the country, for an enterprise, such as you never before engaged in . . . you stood by us like men; you put in your money to the extent of your ability—far more, in proportion to your means, than any man in New York or New England; they put in of their abundance, and small amounts of their abundance, but you, with your comparatively small means gave all that was in your power to give."

From 1852 until his retirement in 1882 Mr. Colton was active in Burlington's administration, being continuously a director, first of the Central Military Tract Railroad, and then through the various system names that eventuated in the present Chicago, Burlington & Quincy Railroad Company.

When present, which was generally the case, he was Chairman at the Annual Stockholders Meetings up to 1876, at which meeting (February 23, 1876) his resignation was accepted and commendatory resolution passed.

That he had continued confidence in the successful growth of the System is evidenced by the record of his stock ownership in the road. From the 250 shares first acquired in 1852, his holdings in 1876 had increased to a total of 673 shares.

His death occurred in Galesburg, Illinois, in 1885.

Louisville & Nashville's Pacifics and Mountains

By DAVID P. MORGAN

"Conservative" has always been the apt adjective for a blanket description of Louisville & Nashville Railroad locomotives. Occasionally the 4776-mile road has set aside this reputation for Paul T. Warner has written that the L&N may have been the first line to ever employ Belpaire boilers on an extensive scale while later, and in our time, the company invested in the most expensive 2-8-4's ever built. As a rule, though, the L&N has been content for others to do the pioneering while it concentrated on a roster of conservatively-proportioned, dependable power.

Certainly the company's passenger power of this century has been cast in a conservative mould. It initiated the purchase of the 4-6-0 wheel arrangement in 1890 and by 1903 it had evolved the G-13, a high-mounted machine with an engine weight of 166,000 pounds. Four years later the road turned to the Pacific type as a more adequate solution to the problem of increasing train weight. In 1905 the Rogers Works delivered an order of five class K-1 engines, Nos. 150-154.

The K-1 was very much an enlarged version of the G-13 she was built to supplement. She had in common a large cab, high saddle, tall domes, slide valves and Stephenson link motion and high-mounted headlight. The significant advantage attained was 36½ per cent greater grate area (45 square feet) in a firebox supported by an inboard-journal trailer. As compared with foreign road Pacifics of that period, the K-1 was exceptionally small. The average 4-6-2 of 1905 weighed over 200,000 pounds; the K-1 had an engine weight of just 187,800 pounds.

Before the advent of its original Pacifics, the Louisville & Nashville had built considerable numbers of its locomotives in its Louisville shops at 10th and Kentucky Streets—formerly the Kentucky Locomotive Works. But while the K-1's were abuilding the L&N was also moving and enlarging its main shops to South Louisville at an eventual cost of over \$2 million. The new South Louisville Shops had the capacity not only to repair but also to build locomotives and until the road came under the control of the United States Railroad Administration in the First World War all further passenger power orders were filled by this facility. During the years 1906-07 South Louisville built 20 K-1 class locomotives; in 1909-10 the Shops completed 20 additional Pacifics of the K-2 class. The K-2 was a modification of the basic Rogers design in that it had piston valves and Walschaerts gear. Both the K-1 and the K-2 were saturated classes. Both had 20-inch cylinders with a 28-inch stroke.

The majority of these 45 Pacifics were subsequently fitted with superheaters and, if the engine was a K-1, rebuilt with Walschaerts gear and new piston valve cylinders. I have been unable to locate the exact dates for this work but available information indicates



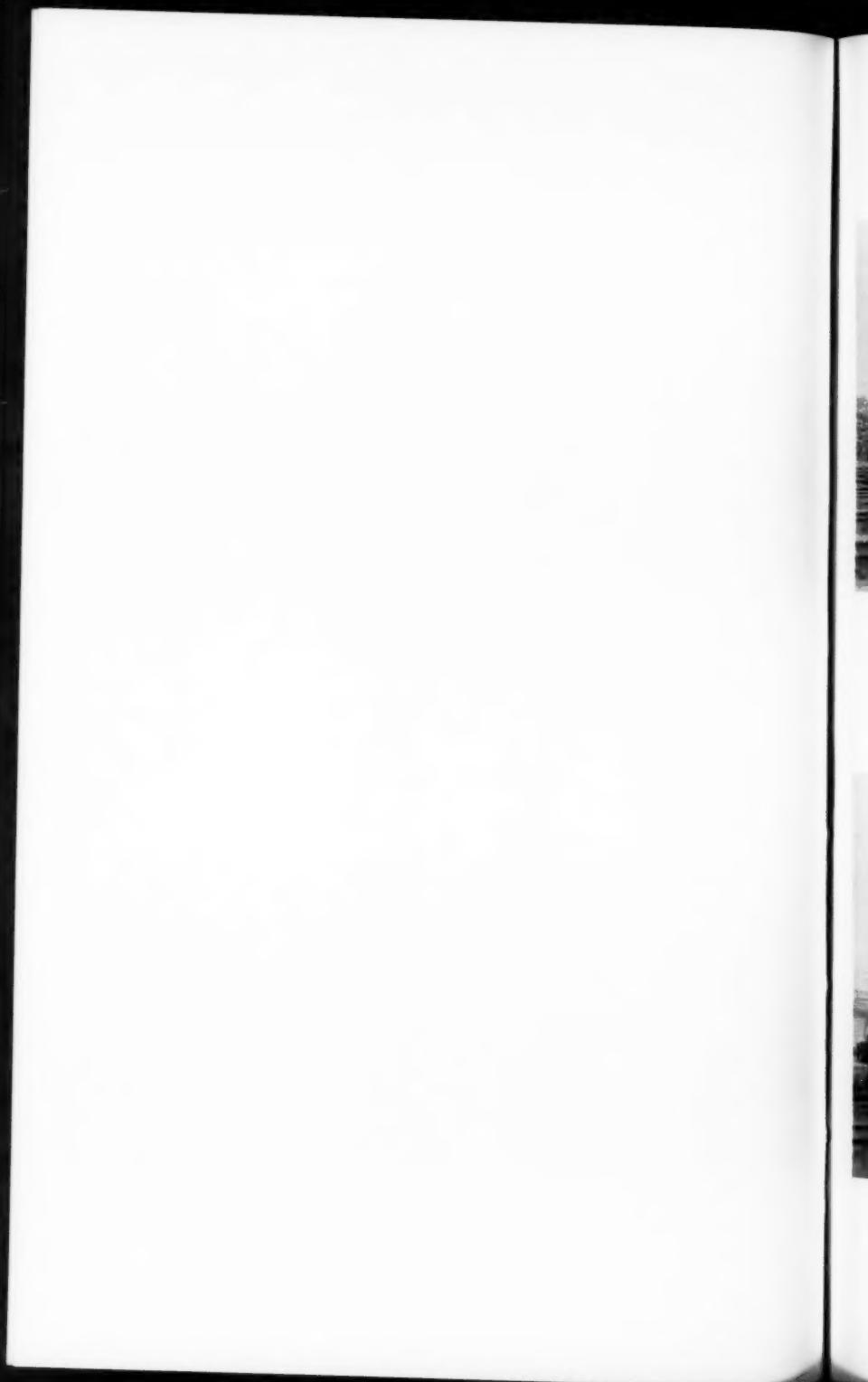
Courtesy of C. E. Fisher

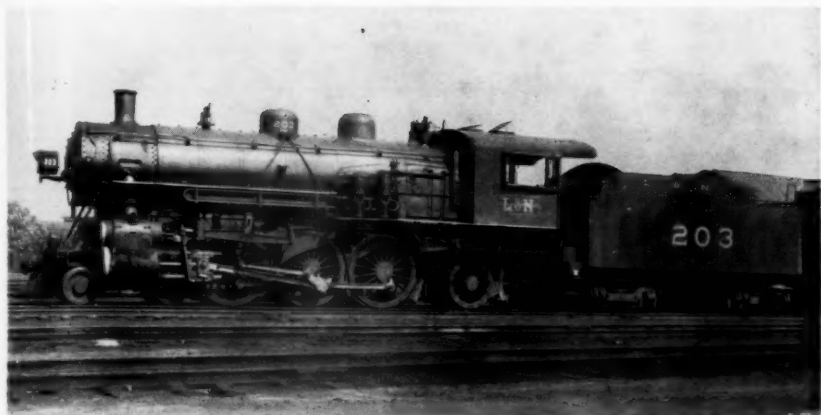
The morning line-up at Paris, Ky., Aug. 1923. The #157 will handle the "Lexington Special" to Cincinnati. L. & N. #153 will follow on the Corbin-Cincinnati local, while the #378 will take her train to Maysville.



Courtesy of C. E. Fisher

L. & N. #178 at Lexington, Ky., 1923. K-2a, L. & N. 1909.





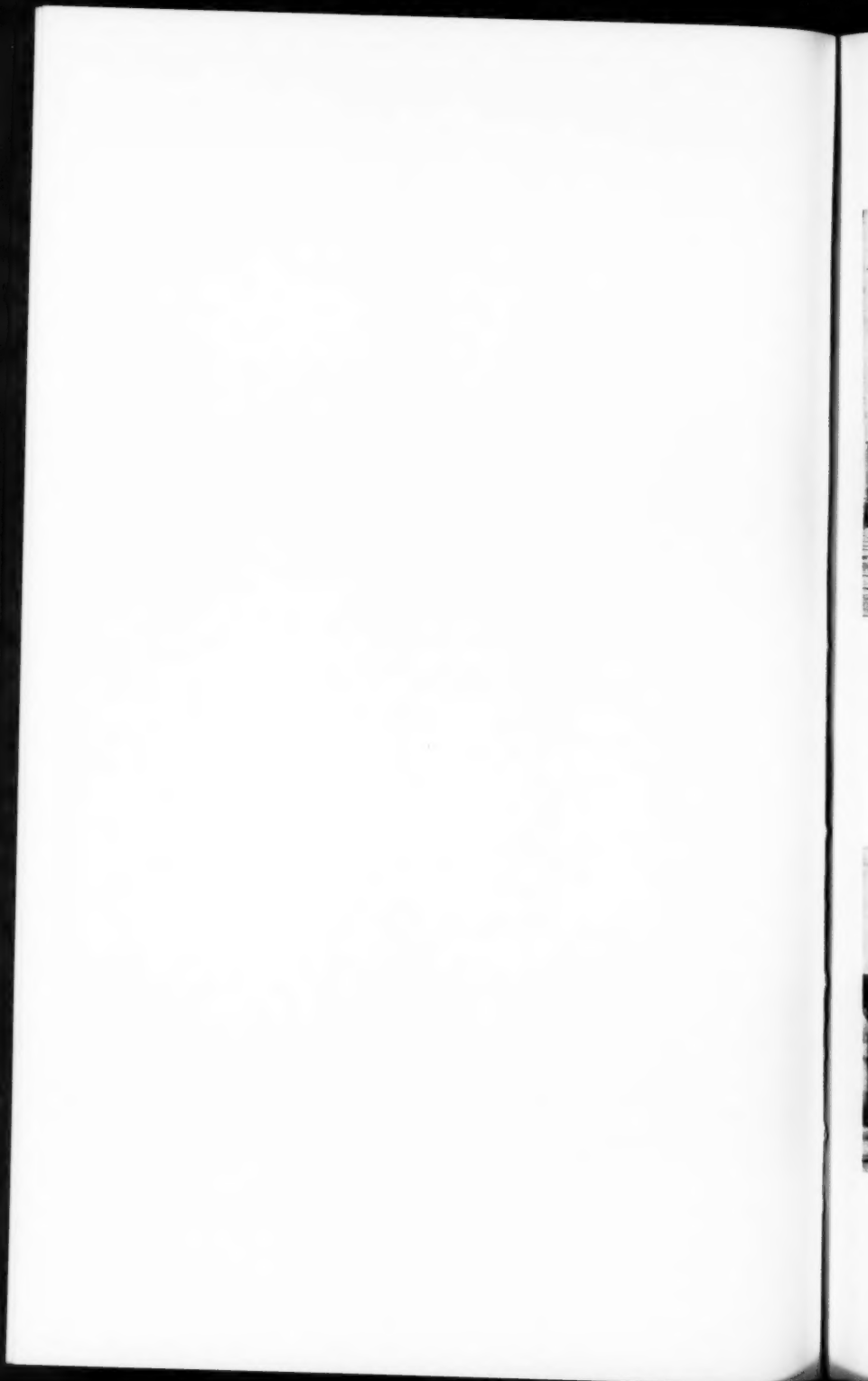
Courtesy of R. J. Foster

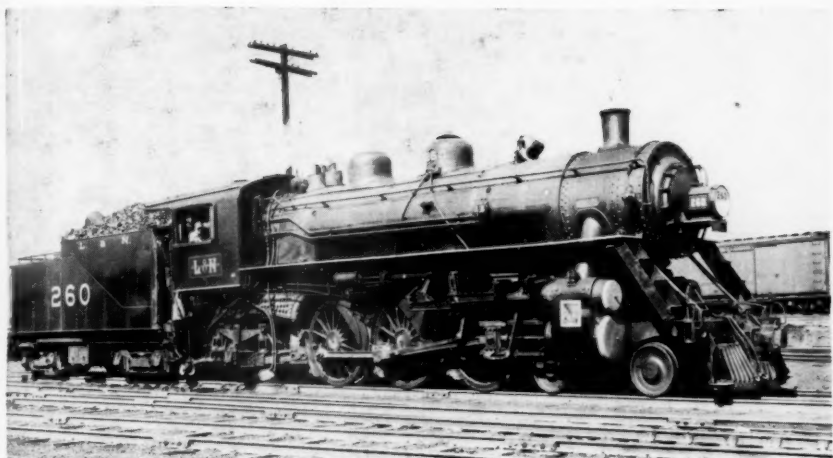
L. & N. #203 at Memphis, Tenn., 1940. K-3, L. & N. 1912.



Courtesy of R. J. Foster

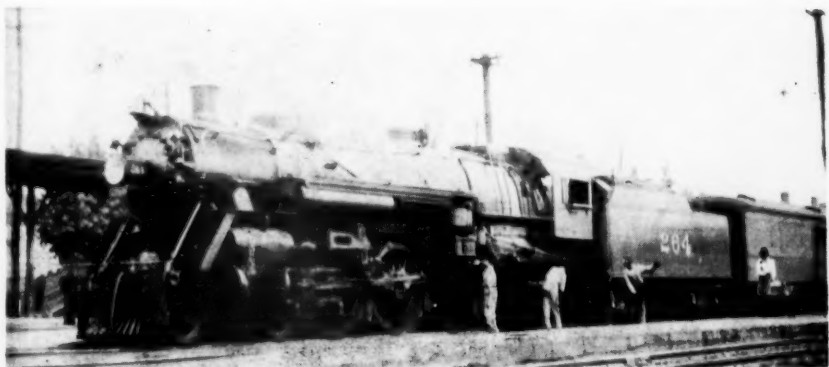
L. & N. #229 at Memphis, Tenn., 1948. K-4, L. & N. 1915.





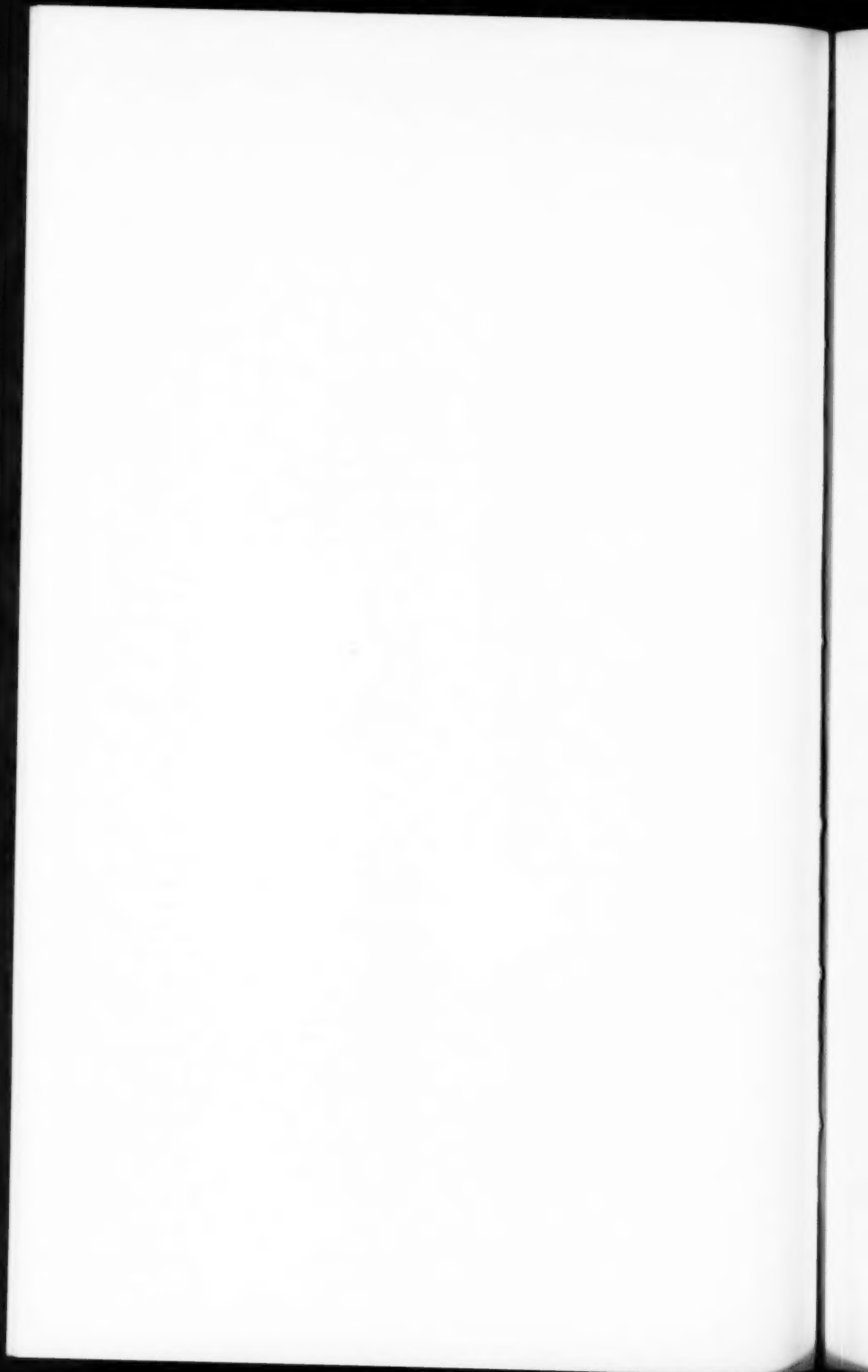
Courtesy of R. J. Foster

L. & N. #260 at East St. Louis, Ill. 1941. K-4b L. & N. 1921.



Courtesy of C. E. Fisher

L. & N. #264 on southbound "The Southland" at Paris, Ky., 1923. K-5 Baldwin, 1923.



that it must have been carried out during or shortly after the First World War. At this time the rebuilt engines were classified as K-2a and cylinder dimensions were increased to 20 $\frac{1}{2}$ x28 inches. In the case of the K-2's it is believed that the original piston-valve cylinders were merely rebored to the new size.

The only L&N passenger locomotive ever equipped with a booster was a K-2 class rebuild, No. 182. Classified as the only K-2b on the system, she was fitted with a Delta trailer which supported a booster engine of 8000 pounds tractive effort. This "extra" was subsequently removed but the 182 retained the Delta truck.

Millard Fillmore Cox is given credit by one of my sources of information for designing the K-3. Mr. Cox learned his trade as Chief Draftsman and Mechanical Engineer for the onetime Richmond Locomotive & Machine Works and served the same plant after its acquisition by the American Locomotive Company. At the time the L&N hired him in 1911 as its Mechanical Engineer, Cox was working for Alco's Dunkirk Works.

The K-3, of which South Louisville Shops built 17 in the years 1912-13, was a somewhat larger locomotive than the K-2 and equipped with a superheater, piston valves and Walschaerts gear. It retained the inboard trailer truck—which had been designed and patented by Reuben Wells. In 1914 Cox enlarged his K-3, equipped it with a conventional trailer truck with outside journals, and classified the new Pacific as the K-4.

Since the K-1 and K-2 classes were consecutively numbered from 150 to 194 with the K-3 class occupying the series 195-210, it appears strange that the original K-4's were numbered 2212-2215 and the next set from 216 on up. The best explanation for this circumstance is that these locomotives were purchased from equipment trust funds and kept in a different block of numbers for easier identification. Obviously the idea was to drop the first "2" at some future date, thus making up the missing 212-215 series—but this was never carried out. Exactly the same numbering policy was used with regard to the L&N first 15 Mikados, which were numbered 2400-2415 instead of series 1400-1415. These engines were also built by South Louisville in 1914.

The company built 28 class K-4 locomotives between 1914 and 1918, at which date the U. S. R. A. had a drastic effect upon the L&N's motive power policy. The road was assigned six of the light U. S. R. A. Pacific type, designated as the 4-6-2-A by the Administration. The K-5, as the road classified the Government newcomer, introduced the "Big Pacific" to the system. Numbered 240-245, the new locomotives outperformed the company's own Pacifics in every department. Incredibly enough, however, the road commenced the construction of 18 additional K-4's during the years 1920-22. The only improvements in the new 246-263 series built at South Louisville were a power reverse and an automatic coal pusher—which still left a wide gap in efficiency and capacity between the homemade and the Government locomotives. These new (and final) company-built Pacifics were classified K-4B's; designation of the 2200's as K-4A precluded that more natural class identification.

An outside order was placed with the Baldwin Locomotive Works for eight more K-5's (Nos. 264-271), which were built in 1923; in the following year the American Locomotive Company delivered 12 additional Pacifics of the K-5 class (series 272-283). All of these postwar K-5 engines were essentially duplicates of the Government design—except that Walschaerts gear was substituted for the Baker motion of the original six engines (and it was removed on these as well), a slightly different cab and headlight were used, and a coal pusher was added.

The one 4-6-2 which could be noted as anything but ordinary was built for the L&N in 1925, numbered the 295, and classed as the K-7. No. 295 was a three-cylinder engine but otherwise similar to the standard K-5. At the time of her construction Alco was engaged in an industrious program of spreading the gospel for such power and it is interesting to note that the Rock Island received a similar engine (No. 999) as did the Missouri Pacific (No. 6000)—both from the same builder. The L&N engine, as will be explained, was later rebuilt and streamlined while Mopac No. 6000 became the 6001 in 1942 when she was converted to a two-cylinder engine and equipped with Franklin poppet valve gear. The CRI&P 999 was displaced in through service by heavier Mountain type locomotives and finally turned into a stationary boiler.

Two other odd classes of Pacific power were added to the roster: K-6 and K-8. The K-6 engines, series 296-299, were originally built by Baldwin in 1912 for the New Orleans, Mobile & Chicago Railroad, a company which is now a part of the Gulf, Mobile & Ohio. These four engines were equipped for automatic train control operation and run almost exclusively between Mobile and New Orleans in a pool with K-4's. The K-8 class, series 81-87, were obtained from the Louisville, Henderson & St. Louis Railway at the time the "Texas" (as it is known) was absorbed by the L&N in 1929. They were constructed by the Richmond Works of Alco between 1923 and 1927. Their engine weight approximated that of the K-3 class. The K-8 was the only modern light Pacific on the roster, and it proved quite popular with engine crews. They saw service all over the north end of the L&N, both on locals and as lead power on doubleheaded trains.

For its heaviest passenger power in steam the Louisville & Nashville once again adopted a Government locomotive. At this point it is worth noting that the L&N acquired considerable numbers of five U. S. R. A. designs—both light and heavy Mikados, the 0-8-0, the light Pacific and finally the Mountain. A minority of such locomotives were placed in service during Government control; the bulk of them were purchased voluntarily after cessation of Administration jurisdiction. All of them did splendid work under a variety of operational conditions.

The motive power department selected the light U. S. R. A. 4-8-2 as the pattern for its L-1 class, and series 400-415 were constructed by Baldwin in 1926. In 1930 an additional six such engines, Nos. 416-421, were obtained from the same Works. These 1930 locomotives were equipped with automatic train control apparatus

for operation over an A. T. C.-protected line of 162 miles between Corbin, Ky., and Etowah, Tenn.

Latter-day Changes and Dispositions:

The Louisville & Nashville Railroad has two backbones—Cincinnati-New Orleans (921 miles) and Cincinnati-Atlanta (490 miles). Supplementing these two arteries are additional mainlines between Louisville and St. Louis, Evansville and Nashville, Bowling Green and Memphis and Flomaton, Ala., and Chattahoochee, Fla. The L-1 Mountains have always been restricted to the Cincinnati-Nashville and Cincinnati-Atlanta lines because within these districts the heaviest gradients on the system are located and because light trestles prohibited their use near the Gulf. A few 4-8-2's were eventually worked into East St. Louis, Ill., from Nashville via Evansville—but this move only came about as a result of diesel displacement from their normal pools.

Aside from the fact that they lacked the boiler capacity and tractive effort of the L-1's, the K-5 Pacifics were the most versatile and capable passenger power on the steam roster of the L&N. For approximately 20 years they were responsible for the bulk of the limited trains and they were heir to the original streamlined services that the company participated in. For an engine of comparatively modest specifications, the K-5 consistently demonstrated a remarkable "overload" capacity as well as a wheel for 85 mile an hour running. Moreover, they had the acceleration and stability for the hill-and-dale, start-and-stop, tortuous-line operation that characterized so much of the system's passenger service.

The L-1's and the K-5's—and the lighter Pacifics that supplemented them—were not what a traveler would call distinguished locomotives. No red-lipped bells or apple green jackets or disc drivers were ever applied on a fleet basis. The only concession that the L&N made to color was a red-and-white metal herald riveted beneath the cab window. So it is difficult to pinpoint the quality about them that endeared each one to local observers such as the author. Perhaps it was the good state of maintenance in which they operated—except during certain wartime months. More likely it was the fact that they managed to equal whatever the competition's larger power could promote by way of longer consist or faster schedule. They did work like this in almost exactly the same mechanical condition they had when new. Occasionally the company dabbled in minor refinements like lightweight crossheads and syphons—but there was no major modernization policy at South Louisville.

About 1940, however, there was a brief splurge of both color and modernization. For unknown cause K-5 No. 245 came forth from classified repairs with her drivers and domes splendidly and artistically striped and trimmed in green and yellow, and her tank circled by two broad bands of yellow. A few weeks later No. 266 appeared in the same dress and a lengthened tank with a water capacity of 14,000 gallons.

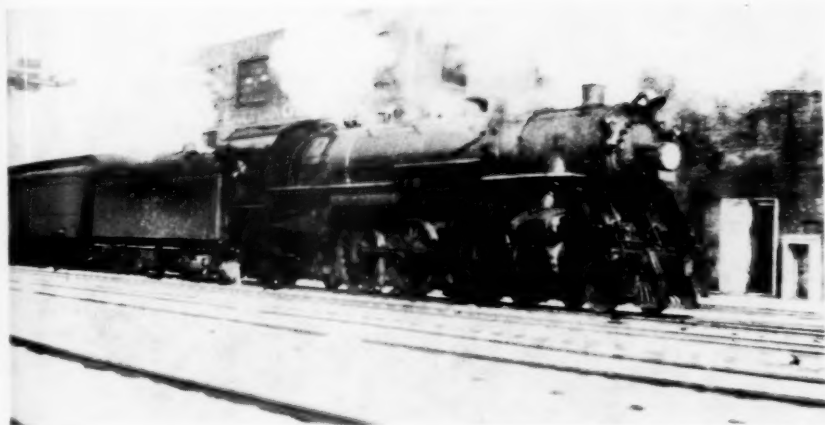
In 1940 there was other notable work underway at South Louisville. In December the road was scheduled to participate in the running of two every-third-day coach streamliners between Chicago and Miami, handling the *Dixie Flagler* between Evansville and Nashville and the *South Wind* from Louisville to Montgomery. For the former train a standard K-5, No. 277, was streamlined and equipped with an enlarged tank. For the *Wind*, K-7 No. 295 was withdrawn from the scrap line at the Strawberry Yard on the south side of the city of Louisville. The three-cylinder Pacific had been a success only in the pages of contemporary Alco literature—and the Shops had been gradually “raiding” her for parts, many of which were interchangeable with those of the K-5 class. The Pacific was rebuilt with a conventional two cylinder saddle, equipped with a feed-water heater and speedometer, and coupled to a new “super-tank.” The streamlining of both the 277 and the 295 was more or less a copy of the Southern Pacific GS-2 *Daylight* design—a “sky-line casing” over stack and domes with a built-in smoke deflector as well as a broad metal skirt at running board level. If the result was not as happy as the Espee’s Lima-developed engine, then at least it was far better than a Nashville, Chattanooga & St. Louis engine converted at the same time and as good as the more-famous Pacific rebuild of the Chicago & Eastern Illinois. Or so we L&N devotees figured in 1940!

The cause for the new 12-wheeled tender of No. 295 was the 205.4-mile non-stop run which the *Wind* was scheduled to make between Louisville and Nashville. The tank, with a capacity of 27½ tons of coal and 20,000 gallons of water, made it possible to skip even the water plugs.

The K-7 dazzled the local press on her first trip by running in the high seventies (which was not a regular practice of the road), but she soon developed a bug. During the reconstruction the weight of two airpumps was concentrated on the pilot beam, a circumstance which overheated the friction-bearing engine truck. A roller-bearing truck corrected this ailment but before this remedy was applied the L&N found it necessary to streamline a third Pacific, K-5 No. 275. As it finally worked out, the three Pacifics were placed in a sort of pool, and the one on the *South Wind* automatically fell heir to the single large tank. Possibly this was the only occasion in railroad practice when one tender was regularly pooled among three locomotives.

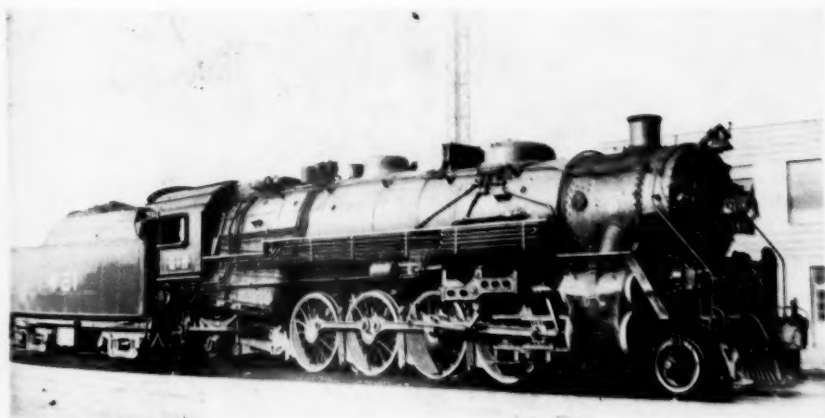
Once the advantages of larger tenders became apparent through practice, the L&N enlarged other standard eight-wheeled tanks, including those of K-5’s Nos. 276 and 279—and these engines became eligible for service on the *South Wind*. It is significant to note that until diesels took over this run after the war it was conceded to be the longest non-stop coal-powered passenger train in the U. S. It was one of those rare but memorable occasions when the L&N not only threw aside its cloak of conservatism but pulled off the spectacular with complete ability.

After the war, and in connection with the operation of the seasonal *Florida Arrow*, the road extended the non-stop running



Courtesy of C. E. Fisher

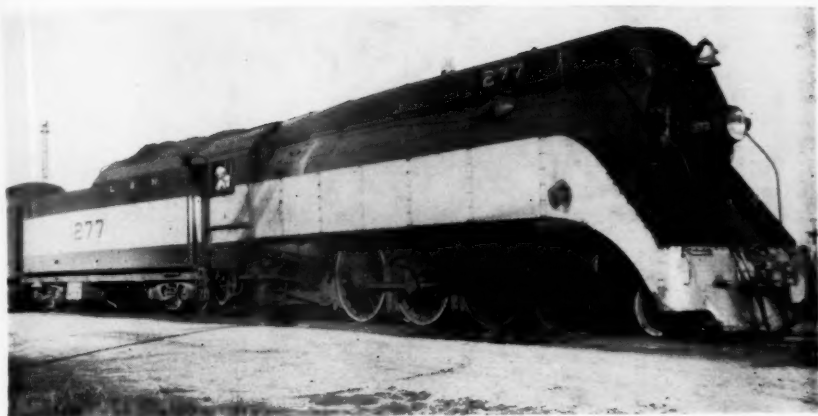
On a cold winter's morning, L. & N. #295 arrives at Lexington, Ky., on the Cincinnati-Knoxville local, 1929. K-7, Brooks, 1925.



Courtesy of R. J. Foster

L. & N. #421 at Cincinnati, Ohio, 1939. L-1, Baldwin, 1930. Last of a group of five locomotives.





Courtesy of R. J. Foster

L. & N. #277 at East St. Louis, Ill., 1951. K-5, Brooks, 1924.



Courtesy of R. J. Foster

The #295 in a new "dress" at Montgomery, Ala., 1947.

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ability of even the L-1 Mountains by adding an extra water car behind the tender. Although this practice is still quite extensive in freight service, this is the only recorded example of its usage in passenger service in this country.

The war was the final stand for all of the Louisville & Nashville's Pacifics and Mountains, of course. The delivery and performance of eight Electro-Motive E-7 type 4000-horsepower two-unit passenger diesels in 1942 (instead of the 4-8-4's which the company had originally inquired for) indicated the pulse of the future. The diesels not only did the work of an L-1 in the mountains but because their weight was spread out over 12 axles per locomotive, they also operated right into New Orleans over the light trestles of the inlets of the Gulf of Mexico.

But until 1945 the diesels could only handle through trains like the *Pan American* and the *Azalean*. The bulk of the work fell to the 4-6-2's and 4-8-2's, and alone or in tandem they did that work. Years before the war an L&N shopman, Tully B. Robb, saw and remembered the early K-1's, and he wrote of his experiences to *Trains* magazine: "Their 69-inch drivers could eat up any grade the Old Reliable had to offer, and on a fast stretch of track they could clip off a mile in 40 seconds . . . most of them were good steamers, and with a good runner who knew how to work his engine, a tallowpot had the world by the tail on a downhill grade. Back in the Model T days, I used to stop along the road just south of Dividing Ridge, Ky., to see and hear No. 2 come up the hill. When the weather was just right you could hear her hit the high Green River Bridge, running like a scared rabbit for the long pull ahead. In the still of the night you could hear her rumble through Munfordville and before long hear her measured exhausts as she started the climb. Her valves, square as a die, made her exhausts a thrilling symphony of sound. . . . As the grade stiffened you could hear the exhausts grow deeper as the hogger latched the Johnson Bar ahead a little. You saw the fireman gracefully swing the scoop, and saw the Shoemaker fire door turning on and turning off the rosy glow of her firebox as it hissed open and banged shut. You could see the hogger perched on his seatbox—hand on the throttle, head out of the window—listening to her talk, ready to catch her should she lose her footing. . . . an old majestic K-1 leading her string of varnish up the hill for a meet at Bonnieville with No. 1."

Few of the saturated K-1's were left by 1941, but the scenes were just as dramatic, perhaps more so. New machines develop bugs, and the L&N's diesels were subject to that truism. During the war there were almost regular periods when a diesel failure would cause a shortage of that power over the last lap of the main stem from Louisville into Cincinnati, a winding, 1 per cent graded 114 miles. The heaviest passenger train over the division was the *Azalean*, Nos. 1 and 4. It had a standard consist north of Louisville of 16 cars and that was frequently increased to 17 or 18—with not a single lightweight coach among them.

A single J-4 Mike could handle such a train, but a more usual headend assignment was a K-4 and an L-1. This pair would replace

the diesels in the morning at Louisville on No. 4, forward it to Cincinnati, then return in the evening on No. 1. I especially recall the tandem of 235 and 407 as they came down through suburban Crescent Hill at nine o'clock of a summer evening. The fire door of the hand-fired Pacific would likely be open, throwing its red light up under the engine smoke passing back over the cab. Behind her the Mountain's crew would be taking it easy after the mountain running—the engineer with his feet up on the backhead, the fireman leaning out to watch the traffic passing up parallel Frankfort Avenue. In the wake of the doubleheader came the long, dark headend cars, the plush-seat coaches, a brace of Pullmans, and—on the rear for easy uncoupling in the city—the diner. It was a momentous sight for those of us who remembered the depression, when the same train seldom had a consist of more than 10 cars and when a doubleheader was unthinkable.

Today the Louisville & Nashville is embarked upon a dieselization program of wide dimensions, especially with regard to passenger services. The original set of eight 4000-horsepower locomotives have been supplemented by many additional units, including road-switchers equipped with steam generators for passenger duties. As a result, practically all of the older company-built Pacifics have been retired along with all but one K-6 and one K-8. A few K-5's have also been scrapped. The future of the L-1 Mountains is somewhat more definite as far as revenue service is concerned for these locomotives are suitable for freight service, and in recent years they have been so used. Occasionally they have also been employed as relief power for the diesel fleet.

Otherwise, the conservative, dependable power is gone—but, as Tully Robb would admonish me, it is not forgotten. A few lines he wrote about the K-1's are applicable to all the K's and all the L's. He wrote, "There are many men living here and there over this old world who feel the same as I do about them. Wherever there is a living hand which once clasped the worn steel throttle, or a back which bent to a scoop on her bouncing deck, or an operator who once held high a hooped order as she bore down upon him, there are memories—deep memories, heart-warming memories."

Acknowledgments:

For the completion of this brief description of two types of Louisville & Nashville locomotives, I am principally indebted to Charles E. Fisher. His unflagging enthusiasm for the article and his generous assistance in helping me to fill in the "blank spots" were of real help. For other data I relied heavily upon four L&N sources: Thomas E. Owen, Editor of the *L&N Magazine*; the road's mechanical department; H. H. Pollitt; and Richard E. Prince, Jr. I also had access to the observations and notes of several good friends in the Louisville area, including Charles B. Castner, Jr., Richard K. Fowler, Jr., the late William L. Greenaway, and Tully B. Robb. Harry Cornell, who was employed in the South Louisville Shops at the time of Mr. Cox's reign, was of special assistance. Paul T. Warner's articles about L&N power, as published in the company's magazine dur-

ing 1930, were of invaluable aid. R. J. Foster and S. R. Wood also gave me the benefit of their L&N data and observations. Many an L&N engineman, who must remain without name, contributed to my knowledge of the road's motive power while his Pacific waited for the highball or took on water at some way station.

LOCOMOTIVE ROSTER

CLASS K-1

150-154 Rogers 1905 6254-6258 Nos. 151-152 K-2a Active #152

Scrap data

150-1940; 151-1948; 153-1939; 154-1949

155-158 L&NRR 1906 6- 9 Nos. 155-157 K-2a

Scrap data

155-1947; 156-157-1940; 158-1948

159-162 L&NRR 1906 18- 21 Nos. 160-161 K-2a Active #160

Scrap data

159-1940; 161-1947; 162-1946

163-164 L&NRR 1906 22- 23 No. 163 K-2a

Scrap data

163-1949; 164-1946

165-174 L&NRR 1907 30- 39 Nos. 165-172 K-2a Active #172

Scrap data

165&174-1947; 166-1948; 167-168-1949; 169&173-1940; 170-171-1939

CLASS K-2a

175-180 L&NRR 1909 49- 54

Scrap data

175&177-1949; 176-1946; 178-1948; 179-1950; 180-1947

181-184 L&NRR 1910 67- 70 Active #181

185-194 L&NRR 1910 85- 94 No. 182 K-2b

Scrap data

182-183&189-1949; 184, 187&191-192-1947; 185-186-1946; 188-1948; 190-1950; 193-1942; 194-1951

CLASS K-3

195-207 L&NRR 1912 150- 162 Active #195 and 207

208-211 L&NRR 1913 200- 203

Scrap data

196-1946; 197, 199-200, 208-209-1949; 198&210-1942; 201-202, 205-206-1948; 203-1947; 204-1951; 211-1939

CLASS K-4a

2212-2215 L&NRR 1914 228- 231

Scrap data

2212-1949; 2213-2214-1951; 2215-1948

CLASS K-4

216-223 L&NRR 1914 248- 255 Active #220

224-233 L&NRR 1915 272- 281 Active #225, 230 & 233

234 L&NRR 1917 312 Active

235-239 L&NRR 1918 313- 317

Scrap data

216, 229, 236-238-1949; 217-1939; 218-219, 221-222, 231-1951; 224, 226-227, 232, 235, 239-1950; 223-1949; 228-1951

CLASS K-5

240-245 Richmond 1919 61057-61062 All Active

CLASS K-4b

246-249 L&NRR 1920 360- 363

250-251 L&NRR 1921 364- 365

252-260 L&NRR 1921 382- 390 Active #253, 255 & 259

261-263 L&NRR 1922 391- 393 Active #263

Scrap data

246-247, 251, 254, 257 & 261-1950; 248-250, 252, 256, 258, 260, 262-1951

CLASS K-5

264-267 Baldwin 1923 55990-55993 All Active
 268-271 Baldwin 1923 56128-56131 All Active
 272-277 Brooks 1924 64795-64800 All Active save 272-273 scrap 1951
 278-283 Brooks 1924 65716-65721 All Active save 281 scrap 1951

CLASS K-7

295 Brooks 1925 66189 Active

CLASS K-6

296-297 Baldwin 1912 38351-38352 Ex NOM&C 40-41
 298-299 Baldwin 1912 38426-38427 Ex NOM&C 42-43

Scrap data

297-298—1951; 299—1950; 296—Active

CLASS K-8

81- 85 Richmond 1923 64518-64522 Ex LH&StL 81-85
 86 Richmond 1924 65372 Ex LH&StL 86
 87 Richmond 1927 67538 Ex LH&StL 87

Scrap data

81-82, 84—1950; 83—1948; 86—1951; 87—1949; 85—Active

CLASS L-1

400 Baldwin 1925 58877
 401 Baldwin 1926 58878
 402-407 Baldwin 1926 58910-58915
 408-412 Baldwin 1926 59523-59527
 413-415 Baldwin 1926 59550-59552
 416-417 Baldwin 1930 61541-61542
 418-421 Baldwin 1930 61549-61552 All Active

SPECIFICATIONS OF LOUISVILLE & NASHVILLE 4-6-2 AND 4-8-2
TYPE PASSENGER LOCOMOTIVES:

<i>Class</i>	<i>Cylinders</i>	<i>Drivers</i>	<i>Steam Pressure</i>	<i>Weight on Drivers</i>	<i>Total Engine Weight</i>	<i>Tractive Effort</i>
K-1	20	"x28" 69"	200 lbs.	115,900 lbs.	187,800 lbs.	27,600 lbs.
K-2A	20½	"x28" 69"	200 lbs.	126,400 lbs.	201,500 lbs.	29,000 lbs.
K-2B	20½	"x28" 69"	200 lbs.	130,100 lbs.	216,000 lbs.	29,000 lbs.
K-3	21½	"x28" 69"	200 lbs.	131,000 lbs.	211,500 lbs.	31,890 lbs.
K-4	22	"x28" 69"	200 lbs.	139,000 lbs.	233,000 lbs.	33,400 lbs.
K-4A	22	"x28" 69"	200 lbs.	139,000 lbs.	228,500 lbs.	33,400 lbs.
K-4B	22	"x28" 69"	200 lbs.	139,000 lbs.	233,000 lbs.	33,400 lbs.
K-4B*	22	"x28" 69"	210 lbs.	139,000 lbs.	233,000 lbs.	35,070 lbs.
K-5	25	"x28" 73"	210 lbs.	162,000 lbs.	277,000 lbs.	42,735 lbs.
K-5**	25	"x28" 73"	210 lbs.	177,000 lbs.	284,000 lbs.	
K-6	22	"x28" 69"	185 lbs.	123,000 lbs.	198,000 lbs.	30,900 lbs.
K-7+ (3)	22½	"x28" 73"	190 lbs.	177,000 lbs.	295,000 lbs.	47,000 lbs.
K-7++	25	"x28" 74"	210 lbs.	184,200 lbs.	315,200 lbs.	42,210 lbs.
K-8	22	"x26" 69"	200 lbs.	126,500 lbs.	210,000 lbs.	31,000 lbs.
L-1	27	"x30" 70"	210 lbs.	226,400 lbs.	334,240 lbs.	55,860 lbs.
L-1+++	27	"x30" 70"	210 lbs.	226,910 lbs.	337,730 lbs.	55,860 lbs.

[The above specifications indicate the locomotive in its existing condition rather than at date of original constructions. Differences between the two except where noted may be considered minor, however.]

FOOTNOTES:

* Nos. 253, 260-263

** Nos. 272-283

+ As built

++ After rebuilding in 1940

+++ Nos. 416-421

Through Car Service From New England

By CHARLES E. FISHER

The six states that comprise the New England group are separated from the rest of this country by natural barriers, either of rivers or mountains. Our gateways, both natural and man-made, have been and are at New York City, the Poughkeepsie Bridge, the Albany, the Mechanicville-Rotterdam Jct., together with those to the north. These barriers have posed as a serious handicap to the free flow of commerce and it was while rummaging through the file of timetables owned by this Society, that the thought came to the author that these contained sufficient information that would interest our membership in the movement of through passenger equipment in and out of New England. For the purpose of this paper, both New York City and Albany must be assumed as in New England otherwise nearly every train operated by the New Haven and the Boston & Albany must needs be considered. Furthermore, we cannot give the dates many of these services were established since our file of timetables is far from continuous. And lastly, this is in no sense a comparison of the services offered today. Travel was far more leisurely at the close of the past century than now and, in the main there has been a steady improvement in these through services that have been retained.

The first physical connection with the railroads running directly westward, was the completion of the Hudson River Bridge at Albany, N. Y., on February 22, 1866, see Bulletin 85. The following year the Boston & Albany R. R. was formed by a consolidation of the Boston & Worcester and Western Railroads. Through car service, beyond Albany, probably was soon inaugurated upon the completion of the bridge but the date of operation of the first train carrying such through equipment is unknown to the writer. Our early timetables did not always show the equipment assigned to the individual trains.

The oldest timetable in our files of the Boston & Albany R. R. that lists the equipment assigned to the different trains is one dated December 1, 1889. At that time the B&A was running three west-bound trains daily that carried through equipment in addition to that needed for local service. Train #1, leaving Boston at 7:00 A. M., carried a buffet vestibuled sleeping car to Cincinnati and another one for Buffalo. At Buffalo connection was made with a Buffalo-St. Louis sleeper and the traveller arrived at Cincinnati at 8:05 A. M. and at St. Louis at 6:00 P. M. the next day. Train #5 left Boston at 3:00 P. M. and carried a Wagner vestibuled sleeping car to Chicago, via the Michigan Central, arriving at 9:00 P. M. next evening. In addition, through sleepers were carried to Cleveland, arriving at 5:30 A. M. and St. Louis at 7:30 A. M., second day. Train #9 leaving Boston at 7:00 P. M. carried a

Wagner sleeping car to Chicago via the Michigan Central arriving at 7:45 A. M., second day. A sleeping car was carried to Cleveland, arriving at 8:00 P. M. and here connections were made for Cincinnati, arriving at 6:20 A. M. and a through car to Columbus. All of these cars were handled by the roads making up the present New York Central System.

The following summer, June 23, 1890, several important changes were made. The time of departure of Train #1 was changed to 8:00 A. M. This train carried a Wagner vestibuled sleeping car to Chicago, via the L. S. & M. S., arriving in Chicago at 10:10 A. M. A through sleeping car for Louisville, Ky, was added, routed via the L&N from Cincinnati, due at Louisville at 12:15 P. M. and connections were made at Albany with a St. Louis sleeper. A new train, #3 was added, leaving Boston at 8:30 A. M. carrying a Wagner drawing room car to Syracuse where connections were made with a through sleeper to Chicago via the Michigan Central and one for Cleveland. The other two trains remained the same save that #5 was assigned a through Boston-Cincinnati sleeping car, arriving at 6:15 P. M.

Sunday, June 7th, 1891, saw the inauguration of the "Boston and Chicago Special." This train, new equipment throughout, left Boston at 10:30 A. M. and arrived at Chicago at 3:00 P. M. next day. It carried a Wagner vestibuled buffet library smoking (club) car and through sleepers to Chicago and a through sleeper for Cincinnati. The dining car ran between Boston and Utica. The other trains were re-arranged somewhat. No. 3 left Boston at 8:30 A. M. and carried a drawing room car to Albany where connections were made with sleepers for Chicago via both the Lake Shore and Michigan Central routes. Train #19 left Boston at 2:15 P. M. with through sleepers for Chicago via the Michigan Central, arriving at 4:50 P. M. Train #5 left Boston at 3:00 P. M. and in addition to the Cincinnati and St. Louis sleepers carried one for Niagara Falls. Train #9 left Boston at 6:45 P. M. with through sleepers for Cleveland and Chicago via the L. S. & M. S. and Detroit and Chicago via the Michigan Central.

The year 1892 is of singular importance—"Commencing Jan. 5, 1892, and on each Tuesday thereafter until April 19th incl. a Palace Buffet Sleeping Car, containing twelve sections of two double berths each, a Drawing Room and Buffet, will leave Grand Central Station, New York, on the 'North Shore Limited' at 4:50 P. M. and run through to San Francisco, without change or delay at Junction points. Connecting train will leave Boston at 2:15 P. M." This car was routed via the New York Central & Hudson River R. R. to Buffalo; the Michigan Central to Chicago; Chicago, Milwaukee & St. Paul to Council Bluffs; Union Pacific to Ogden and Southern Pacific to destination. Leaving New York on Tuesday, the traveller arrived in San Francisco on Sunday, in time to attend evening service! Train #19, leaving Boston at 2:15 P. M. was also given the name—"North Shore Limited."

Until the turn of the century, save for some slight changes in car routings and earlier arrivals at destination, the service continued much the same and was, perhaps, the foundation of what the B&A offers at present. At the turn of the century, July 1, 1900, the Boston and Albany was leased to the N. Y. C. & H. R. R. R. The "Wagner" cars went out and the "Pullmans" came in. One of the first trains to note that change was #15, the "Boston and Chicago Special" for it was now equipped with a "Pullman Buffet Library Car with Bathroom and Barber Shop!" A St. Louis sleeper was added to the train and, it appears that the dining car ran through from Boston to Chicago. Train #17, leaving Boston at 2:00 P. M. carried through sleepers to Chicago via the Michigan Central and one for Cleveland via the L. S. & M. S. Train #29, the "South Western Express", leaving Boston at 6:00 P. M., carried a through sleeper for Cincinnati arriving at 7:50 P. M. next day and another sleeper to Chicago, via the Michigan Central, arriving at 9:00 P. M. A tourist sleeper was operated on #23, leaving Boston at 4:15 P. M., for Chicago. On Tuesday, Thursday and Saturday, the car was operated over the Michigan Central, the other three week days via the L. S. & M. S.

It was not until October 3, 1909 that the famous "Twentieth Century Limited" was given a Boston connection. The train left Boston at 1:00 P. M. and, with the local equipment, carried one through sleeper for Chicago. In June, 1912, the hour of departure was changed to 1:30 P. M., time of arrival in Chicago was 8:55 A. M. Subsequently the time of departure was changed to 12:30 P. M. arriving at Chicago at 9:45 A. M. and, through sleepers for Cincinnati and Pittsburgh were handled out of Boston and assigned their proper trains at Albany. June, 1910 saw train #17, the "Wolverine" scheduled. Leaving Boston at 2:00 P. M., with club car, sleepers and tourist sleeper to Chicago, via the Michigan Central, the train arrived in Chicago at 3:30 P. M. A St. Louis and a Cincinnati sleeper were handled out of Boston. This timetable also shows #49, leaving Boston at 4:45 P. M. Starting with through Chicago sleepers via the L. S. & M. S., sleepers via the Michigan Central were added and, by 1918, through cars to Toronto and Buffalo were carried.

It is not my purpose to attempt to list every change made in the operation of this through service for they would prove wearisome. During the "plush twenties" the B&A operated some very heavy trains, all Pullman, but they restricted their coach service to the slower night trains and, all through coach passengers were forced to change at Albany. The "Eight Through Trains to the West Daily" were confined to Pullman passengers mainly. In more recent years, the New York Central has not only improved the coach equipment but through coach service is now offered to almost the same points as the sleeping car equipment. The "New England States", a thoroughly modern train of coaches and sleepers has replaced the "Century." The "Wolverine" continues to service

Michigan Central points and carries a sleeper via the former L. S. & M. S. The "Southwestern Limited" serves St. Louis, Cleveland and Toronto and there are three additional trains carrying through equipment to points on the New York Central System. This was the earliest route that linked Boston and New England with New York State and the Mid-west. It has always been the most important and the better patronized but subject to severe competition as we shall see when we come to the other railroads. However, take it by and large, New England has had little to complain of the through service that this route has offered.

Turning from the west to the south, we come to the New York & New England R. R. Had this railroad been able to effect an entrance into New York City or had it been able to promote a good western connection and roll out some of those grades on the line west of Hartford, the railroad map of New England might have been different. The management never lacked for ideas and did not hesitate to put them into practice. The inauguration of the "White Train" on March 16, 1891 was one of them but, we are not interested in the Boston-New York service.

In connection with the Philadelphia Centennial, the N. Y. & N. E. on May 8, 1876 inaugurated the "Washington Night Express." Leaving Boston at 7:00 P. M., the train used the N. Y. N. H. & H. R. R. from Hartford to Harlem River. Here the transfer steamer "Maryland" ferried the cars to Jersey City and the balance of the journey was completed via the Pennsylvania; Philadelphia, Wilmington & Baltimore and Baltimore & Potomac Railroads, arriving at Washington at 1:07 P. M. In the years that followed the running time was reduced to permit an earlier arrival in Washington and, in our files we have a letter that indicates a through sleeper to Jacksonville, Fla. was attached to this train during the winter of 1892-3. It would seem as though the connecting roads played "fast and loose" with this train and, on January 29, 1893, under the name of the "Federal Express", it was transferred to the Shore Line. The loss of the S. S. "Titanic" brought about new regulations in our coastwise shipping and the transfer steamer "Maryland" was discontinued. The train made an earlier departure from Boston, 4:00 P. M., and was routed via Poughkeepsie Bridge, L. & H. R. to Phillipsburg and P. R. R. to destination. It was the first regular train to cross the new Hell Gate Bridge on April 1, 1917 and it is still in operation and is one of the heaviest and most important of the Boston-Washington trains.

But the N. Y. & N. E. did not give up without a struggle. Their timetable for August, 1893 shows a "Washington Night Express" leaving Boston at 7:00 P. M. with through sleepers to Washington and was routed via the Reading and B&O Railroads arriving at Washington at 11:20 A. M. The timetable shows a Chicago connection via the B&O due in Chicago at 11:55 A. M. second morning. Lack of patronage caused the withdrawal of this service soon after it was started.

The timetable of May, 1876 shows a "Philadelphia Day Express" leaving Boston at 9:00 A. M. and following the same route as the "Federal Express." The train carried through Pullman Parlor cars and arrived at Philadelphia at 8:50 P. M. It was doubtless put on for the Centennial and was probably withdrawn at its close.

The World's Fair at Chicago in 1893, caused the road that summer to operate the "Isabella Express" on Tuesday, Thursday and Saturday, via the Erie Ry. The train left Boston at 8:30 A. M. and carried through sleepers to Chicago arriving at 8:15 P. M. the second evening. See Mr. Merrill's account of his trip on this train in Bulletin 65. This train had always made a connection with the Erie at Turners and it would seem that this train carried through equipment for the occasion.

One other train deserves mention, even tho' it is not within the scope of this paper. The March 12, 1893 schedule shows a night train between Boston and New York which operated in connection with the New York & Northern R. R. from Brewsters to 155th Street, New York City. Leaving Boston at 10:00 P. M., this train carried through coaches and sleeper(s) and arrived at 155th St. at 6:00 A. M. From this point the passenger proceeded downtown via the elevated railway. This train ran only for a very short time.

With the bridges built across the Connecticut and Thames Rivers, thus eliminating the delay at the ferries, the Shore Line between Boston and New York was in a position to compete with the other lines. On May 12, 1890, the Old Colony; New York, Providence & Boston and New York, New Haven & Hartford, with the Pennsylvania, placed in service the "Philadelphia Day Express." On October 13th of that year the run was extended to Washington and on Jan. 4, 1891 it was discontinued. A year later, Jan. 18, 1892, it was restored in the "Colonial Express" leaving Boston at 9:00 A. M. and arriving in Washington at 9:45 P. M. The service was interrupted for the same reason given as that of the "Federal Express" but, trains terminating in New York City were operated by both the New Haven and Pennsylvania roads.

On April 1, 1917, upon the completion of the Hell Gate Bridge, both the "Federal" and the "Colonial" were restored via this route. In the years that have passed, other trains have been added to this route and, in the winter time, through sleepers are in operation between Boston and Florida points. The New Haven timetable of November, 1917 shows through cars in operation from Boston to Pittsburgh, St. Louis and Cincinnati but, of these three cars operated, only the Pittsburgh sleeper remains. At one time a through sleeper was operated from Boston to New Orleans but, for all-year service, the through runs end at Washington or Pittsburgh and they end not only at Boston but extend as far north as Montreal and, in the summer months, to Ellsworth, Maine.

In connection with this Washington service, mention should be made of two trains routed via the former Central Massachusetts

R. R. The Boston & Maine timetable for May, 1892 shows their train #609, the "Harrisburg Express" leaving Boston at 8:00 A. M., with Pullman buffet drawing room cars for Harrisburg, Pa., arriving at 12:10 Midnight. The train was routed via the B&M; N. Y. N. H. & H.; C. N. E. & W.; L. & H. R.; C. R. R. of N. J.; P&R to destination. The timetable of October, 1892 shows train #651 leaving Boston at 5:50 P. M., the "Washington Express" arriving at Philadelphia at 8:15 A. M. and Washington at 11:20 A. M. The routing was the same as the Harrisburg train save the B&O was used to enter Washington. This train carried a through sleeping car to Washington and was seen many times by one of our members. It consisted of a combined baggage and smoker and a coach, both terminating at Northhampton, the through sleeper being handled by the connecting roads on their trains. These were two attempts to serve the towns north of Boston, in addition to those enroute but there was not enough business and they were soon withdrawn.

With the opening of the Hoosac Tunnel in 1876 and the subsequent lease of these railroads by the Fitchburg R. R., Boston and New England were afforded a second route to the west. The earliest timetable owned by this Society is dated August, 1882 and shows three trains carrying through equipment to western points. The first train left Boston at 8:30 A. M. and carried a through sleeper for Chicago via the N. Y. C. & H. R. and Michigan Central Railroads, arriving at 9:10 A. M. next day. The second train left Boston at 3:00 P. M. and carried a through sleeper to St. Louis, via the N. Y. C. & H. R.; Canada Southern and Wabash, St. Louis & Pacific Railroads, arriving at 8:40, second morning. This train also carried a through sleeper to Cincinnati, arriving the second morning at 6:05 and was routed via the D&H; New York, Lake Erie & Western and New York, Pennsylvania & Ohio Railroads. The "Pacific Express" left at 6:00 P. M. and this train carried a through sleeper to Chicago, via the N. Y. C. & H. R. and Michigan Central roads, arriving at 8:00 A. M., second morning. One thing the Fitchburg R. R. did, which I have never observed on any other New England road, and that was to issue separate timetables for the eastbound and westbound services. This was done for a few years and subsequently discontinued.

In the years that followed, the Fitchburg steadily improved their service but, the New York Central favored the Boston & Albany and the Fitchburg cars were handled by the West Shore division and other connections at Buffalo. A timetable of June 4, 1900, almost a month prior to its lease to the Boston & Maine R. R., shows the Fitchburg service when it was about at its best. At that time there were four trains westward that handled through equipment. The first train was #29, the "Day Express", leaving Boston at 9:30 A. M. with a through Pullman parlor car to Binghamton, N. Y., via the D&H and Erie and at Binghamton, connection was made with through sleepers to Chicago, Cincinnati and Cleveland arriving in Chicago at 5:00 P. M., Cincinnati at 2:45 P. M. A

through tourist sleeper for Chicago, three days per week, was also handled on this train. For the pleasure seekers, a through parlor car to Saratoga Springs was operated on this train during the summer months. At 1:00 P. M. the "Continental Limited" left Boston, train #1. In addition to the local equipment, this train carried a Pullman buffet sleeper to Chicago, via the Wabash Ry., arriving at 3:35 P. M.; one for St. Louis via the same route arriving at 7:15 P. M. and a tourist sleeper to Chicago, via the N. Y. C. & St. L. R. R. arriving at 5:25 P. M. Train #3, the "Chicago Express," leaving Boston at 3:00 P. M. carried a through sleeper to Chicago via the Wabash Ry. arriving at 9:30 P. M.; a Pullman buffet sleeper for Chicago via the N. Y. C. & St. L. R. R. arriving at 9:15 P. M. and a Pullman sleeper for Chicago via the Erie Ry., arriving at 7:35 P. M. The last train was #19, the "St. Louis Express," leaving Boston at 6:40 P. M. and this train carried a through Pullman buffet sleeper to St. Louis via the West Shore and Wabash roads, arriving at St. Louis at 7:15 A. M., second day. The running time of these trains was comparable to that offered by the B&A and New York Central roads and the equipment was every bit as good. This timetable shows the through service in connection with the Rutland R. R., with which the Fitchburg was always closely allied. Of the three trains operated in connection with this road, only #505, the "Night Express," leaving Boston at 7:15 P. M., carried any through equipment beyond New England points with a through Pullman sleeping car from Boston to Montreal. A coach, leaving Worcester at 7:35 P. M., was attached to this train at Winchendon and carried through to Montreal, arriving at 7:40 A. M. In later years, this train carried a through sleeper to Ogdensburg, N. Y. and the day train, the "Green Mountain Flyer" carried a through coach and parlor car to Montreal which was added to its counterpart from New York, at Rutland.

When the Boston & Maine acquired the Fitchburg R. R. under lease, this service was continued and improved, not only in running time but by additions in new equipment and dining cars to these trains. But the business was gradually slipping over to the B&A and New York Central roads. As late as September, 1914, it had been reduced to train #5, leaving Boston at 9:35 A. M. which carried a through tourist sleeper to Chicago, Wednesday only, via the D&H and Erie R. Rs. Train #1 left Boston at 1:00 P. M. with a through Chicago sleeper via the West Shore and Wabash R. Rs.; a tourist sleeper three days per week via the same route and, on the alternate days a tourist sleeper to Chicago via the N. Y. C. & St. L. R. R. Train #3 left Boston at 4:00 P. M. with a through Chicago sleeper via the D&H and Erie and train #21, leaving at 6:09 P. M. with a Chicago sleeper via the West Shore and N. Y. C. & St. L. R. Rs.

This service was one of the casualties of the U. S. R. A. of World War I and was never fully restored. On May 15, 1926, the B&M inaugurated the "Minute Man" between Boston and Troy,

N. Y. In addition to the local equipment, a through sleeping car to Chicago was carried. The management felt that a through sleeper for Chicago, leaving from the North Station, thus saving the trip across the city of Boston to the South Station, could be made to pay and, the B&M schedules were closely co-ordinated to connect with this train at Boston and elsewhere. It was no longer possible to use the Rotterdam Jct. delivery and this car was attached to one of the Albany-Troy locals and then attached to a New York Central train at Albany, generally #22, the "Lake Shore Limited." For a number of years, this service with some changes on the New York Central trains continued, but the difficulty of maintaining good local service in connection with this through service on the same train, caused the sleeping car to be discontinued and, today, only local equipment is operated on this division.

Many of the early timetables of the Boston & Maine leave much to be desired in the matter of equipment. In 1871, the Eastern R. R. inaugurated the "Bangor Express" carrying through sleeping cars from Boston to Bangor, Maine. This was the first train that operated through Portland without change of cars. A timetable of 1886 shows this train still in operation with connections for the Maritime Provinces. Whether it carried through equipment to St. John and Halifax, I do not know. In later years it was the leaving time of the "St. John's Express" until it was moved to 10:30 P. M. and renamed the "Gull." The coaches were jointly owned with the names of the three owners on the car body. It always was a very heavy train and well patronized and is the only all-year train to the "Provinces" tho' the service has been augmented in times past with either an additional train or by the placing of through equipment on certain Bangor trains.

On September 17-19th, 1851, Boston celebrated the opening of the Vermont Central Ry. with a Jubilee that included parades, speech-making and all that goes with such an event. This route was to bring the Great Lakes and the West in close touch with Boston and New England via the Boston & Lowell, Concord; Northern and Vermont Central railroads. For no little time it was known as the "Great Northern Route"—long before James J. Hill completed his railroad of that name. It was not until a few years later that the Boston, Concord & Montreal was completed to Woodsville, N. H. and this route, with its connections, opened a second route to Montreal.

When through sleeping cars were inaugurated via either of these routes, we have no timetable that gives us this information. A description of one of the wrecks on the Vermont Central mentions sleeping cars on the train. A timetable of 1876 states that Pullman parlor cars are carried on all day express trains and sleeping cars on the night trains but it is not until 1886, in a Boston & Lowell timetable that we find three trains carrying through equipment to Montreal. Train #53 left Boston at 8:30 A. M., arriving at 8:30 P. M. and train #145, leaving Boston at 1:00 P. M., arriving at 11:30 P. M., both carried Pullman parlor cars Boston to Montreal,

making direct connections for Chicago, via the G. T. R. Train #285, leaving at 7:00 P. M. due in Montreal at 8:20 A. M. carried a through sleeper for Montreal. These three trains were routed via White River Jct.

The Concord & Montreal R. R. timetable for Sept. 1890, in addition to listing the three above trains, shows a train leaving Boston at 9:00 A. M., with a through parlor car for St. Johnsbury, Newport and Montreal via the Montreal & Boston Air Line, due in Montreal at 8:25 P. M. The "Montreal & White Mts. Express" left Boston at 7:30 P. M. with through sleepers to St. Johns and Montreal via the same route and a through sleeper to St. Paul, Minn., via the C. P. R. and Soo Line, due at 7:25 A. M., third day. The Boston & Maine timetable for 1890 shows the 1:00 P. M. train from Boston, #59, with a through sleeper to Chicago, via the G. T. R., due at 7:45 A. M., second day.

This was the commencement of the through service to Montreal and the west which continued to grow through the years. The White Mountains, long since famed as a summer resort, was an attraction and it meant heavy trains and fast service over the Boston & Maine which was now in control of the Boston & Lowell; Concord & Montreal and Northern Railroads. The timetable for March, 1904 shows train #177, leaving Boston at 8:30 P. M. with through sleeping cars to Montreal via the C. P. R.; to Chicago via the C. P. R. and Wabash due at 10:22 A. M. second day and a sleeper to Sherbrook due at Noon, next day.

In common with many of our New England railroads, the B&M published a summer timetable listing their through services and connections only. The one for the summer of 1907 shows improvement in the western service via the old Fitchburg R. R. Turning to the northern service, train #33, leaving Boston at 9:00 A. M. due in Montreal at 8:10 P. M. still carries the parlor car and coaches to Montreal. Train #41, leaving Boston at 10:00 A. M. carries a through sleeper to Minneapolis via the C. P. R. and Soo Line, due at 9:30 A. M. second day and, a tourist sleeper to Vancouver, B. C., via the C. P. R., Wednesday only, due at 10:50 A. M. Tuesday. Train #55, the "New England States Express," left Boston at 11:30 A. M. with a through sleeper to Chicago via the C. V. and G. T. R., with a tourist sleeper for Chicago twice a week. Parlor car and coaches were carried to Montreal where they arrived at 10:10 P. M., the time of arrival in Chicago was 9:10 P. M. next day. Train #71 leaving Boston at 1:00 P. M. carried a through parlor car and coaches to Sherbrook, P. Q., via White River Jct., arriving at Sherbrook at 11:10 P. M. Train #171, leaving Boston at 7:30 P. M., carried a through sleeper to Montreal arriving at 7:25 A. M.; one for Chicago arriving at 7:42 A. M. second day; one for Depot Harbor arriving at 9:15 P. M. next evening and coaches to Montreal via the C. V. and G. T. R. Train #177, leaving Boston at 8:30 P. M., via the C. P. R., carried a through sleeper to Levis (Quebec) arriving at 12:00 Noon; a through sleeper to Montreal

arriving at 8:20 A. M.; another for Chicago via the C. P. R. and Wabash arriving at 10:22 A. M. second morning and through coaches to Montreal and Levis. In 1907, there were more trains leaving the North Station of Boston, with Chicago equipment, routed either via the Fitchburg or the Southern Divisions of the B&M than left from the South Station of the B&A. Altho' this route to the west via the B&M and its connecting lines, was a bit longer than offered by the B&A-NYC, it had its compensation in a lower fare and the equipment was every bit as good as offered by any competitor. With the White Mountain business at its height in the summer time, the B&M handled some very heavy trains during these months and the through service was in direct competition with that offered by the B&A and New York Central roads.

The railroads making up the "Connecticut River Line" from Springfield, Mass., northwards, commenced operating their through service in connection with the N. Y. N. H. & H. R. R. As early as 1876 there were cars on the 8:00 A. M. and 8:00 P. M. train from Springfield to the White Mountains during the summer months. A Wagner sleeping car left New York at 3:00 P. M. for St. Albans and was attached to the 8:00 P. M. train from Springfield. A decade later this service had been extended to include Montreal and Quebec. In August, 1886, the "White Mountain Express" was in service, a through train from New York to Fabyan's. During the summer of 1907 the B&M operated through sleepers from New York to Levis and Sherbrook on train #59 leaving at 9:00 P. M., with cars for five other points, chiefly in the White Mountains. Train #49, leaving Springfield at 8:15 P. M. carried through coaches and sleeping cars to Montreal via the C. V. and G. T. R.; a sleeping car to Sherbrook and a coach to Montreal via the C. P. R. This is the route used today by the "Washingtonian" and the "Montrealer", the through trains between Washington, D. C. and Montreal.

The Boston-Montreal and western service suffered as the result of the U. S. R. A. during World War I. The through sleepers to Vancouver, Minneapolis and Chicago were withdrawn and were not restored. The differential fare was lost with the I. C. C. ruling of charging on a mileage basis and the Boston-Montreal service is reduced to a day train over each route and a night train that divides at White River Jct. and then proceeds over separate routes. The shorter route via the Rutland, no longer has through service from Boston. In 1907 you could leave Boston at 11:30 A. M. and arrive in Montreal at 10:10 P. M. Today you can leave Boston at 12:30 P. M., due in Montreal at 9:30 P. M., via the same route. Even so, the service today leaves something to be desired.

One other movement deserves mention in connection with the Montreal service. When the Grand Trunk threatened to invade Providence, R. I. by the building of a new railroad from Palmer, Mass., to that city, the New Haven timetable for June 2, 1912, shows a restoration of the service once offered by the Fitchburg R. R.

A through coach left Providence at 6:05 P. M., via Worcester and Fitchburg where it was attached to the 7:15 P. M. Boston-Montreal train via the Rutland R. R., arriving in Montreal at 7:25 A. M.

Portland, Maine has not been without its western connections and one of the most interesting is found in a Rome, Watertown & Ogdensburg R. R. timetable for the summer of 1890. The train leaving Portland at 8:45 A. M. carried a through Wagner buffet sleeper via the Maine Central; St. Johnsbury & Lake Champlain; Central Vermont; R. W. & O. and Michigan Central roads. The traveller dined at Fabyan's at 1:00 P. M., was due at Norwood, N. Y. at 11:15 P. M. and Niagara Falls at 9:40 A. M. Connection was made with a Michigan Central train leaving Buffalo at 1:38 P. M., due in Detroit at 8:45 P. M., Chicago at 8:05 A. M. This was an attempt to bring the White Mountain resorts in closer touch with the mid-west but, the Central Vermont "broke up the party" and it is a question if it could have been made to pay in the long run.

The oldest route between Portland and Montreal is that of the Grand Trunk Ry. Here again, lack of early timetables prevent us from checking any through car service. In August, 1876, the statement is made that through Pullman sleeping cars are operated on all express trains—we can only assume that Portland and Montreal were thus favored. They were in operation a decade later. The timetable of June, 1902, gives one the impression that a through sleeper was in operation out of Portland to Chicago on the "International Limited," leaving Portland at 8:35 P. M., due in Chicago at 7:20 A. M., second morning.

The old Portland & Ogdensburg R. R., subsequently leased to the Maine Central, with its connection with the Connecticut & Passumpsic Rivers R. R., later leased to the B&M, with the C. P. R., offered a second route, probably the most scenic route in New England, between Portland and Montreal. Here again, lack of early timetables prevents any statement other than that found in the R. W. & O. for 1890 regarding the through car movements. Although there were two trains daily over this route in 1892, there is no evidence that either carried any Montreal equipment. In the summer of 1907, however, both of these trains carried through parlor or sleeping cars between Montreal and Old Orchard Beach, that famous resort below Portland and, similar service was also offered in connection with the G. T. R. from Montreal. The Maine Central continued this summer service until the early 1930's, in fact the week end train was a very heavy train in both directions. The Maine Central timetable for June 26, 1916 shows a through sleeper from Portland to Chicago via the C. P. R. and Michigan Central R. Rs. The car left Portland at 9:30 P. M., was attached to the morning train from Montreal, due in Chicago at 7:55 A. M., second morning.

These are some of the through car movements from New England. Please note I have listed only the outward movements; the inward movements were just as numerous and were just as

good in the matter of service and running time. I have made no attempt to list their commencement, our file of timetables is not complete enough for that purpose. Rather, this is an attempt to list some of these forgotten services and to show that our New England managers were alert and alive to the need of good service between New England and our mid-western states.

But this service brings to mind the fact that a few years ago there appeared an advertisement under the caption of a certain railroad company to the effect that a hog was given through service from the west to east but that passengers were obliged to change in Chicago for such a journey. It was true at the time that Chicago was the point of change and, it might be implied that this railroad was the originator of the idea even tho' they were powerless to put such a plan into effect. For my own part, I have always felt that this advertisement, along with some other of their material produced at the time, was in very poor taste. It always behooves one to examine his own interests first and rather than "needle" other roads into doing something, it would seem as though their management in the conduct of their own affairs is not above criticism.

One thing that the above road might have observed from a study of the past and that is that for four months in 1892, the New York Central & Hudson River R. R. did operate a weekly sleeping car between New York and San Francisco in connection with other roads. But the palm goes to the managements of our northern New England railroads in that for several years they operated a through sleeping car from Boston to St. Paul or Minneapolis and a weekly tourist sleeper to Vancouver, B. C., making it at the time, the longest sleeping car run on the continent. True, these cars did not go through Chicago but they did originate on the Atlantic seaboard and they went to points west and northwest of Chicago and one service was inaugurated over sixty years ago!

It has been a genuine pleasure to go through these old passenger schedules since they recall a flood of recollections of the trains of the years gone by. To Jason Swadkins, for his time and patience in helping prepare this material, I want to extend my thanks and appreciation. Even had World War I not intervened, I doubt if many of these routes could have survived the depression years but, it would make an interesting trip from Boston to Chicago via the D&H and Erie, or via the Wabash or through the land of our northern neighbor. Yes, many of these routes are now a thing of the past and I hope that bringing them to the attention of our membership will help stimulate their interest in them.

100 YEARS OF RAILROAD PROGRESS 1851-1951

By J. HAROLD KIRACOFFE

FOREWORD

This is not intended to be an authentic factual history but rather a chronological narrative of the coming of the railroad to this community and its development thru later years as reported in local papers of the times and local histories.

By 1830, the Erie Canal had been completed and was in operation. Several canals had been built and were operating in Indiana. A new trend in construction was occupying the public mind. Railways were being urged as the coming method of transportation. There was idle capital in the country and in England looking for profitable investment and the Ohio Valley presented enticing prospects. A project was started to construct a double track road between Lake Erie and Lake Michigan and then extend on to the head of navigation on the Illinois River. The proposed road was to originate at the mouth of the Maumee and reach Lake Michigan at Michigan City.

In 1835 the Buffalo and Mississippi Railroad Company received a charter from the State of Indiana fixing the termini of the road as Michigan City and Laporte. The first meeting of the promoters was held in Elkhart, Indiana at the residence of Colonel Stephen Downing, May 25, 1833. A Corporation was formed in February, 1837 and grading contracts were advertised for bidding on April 28, 1837 for construction between Laporte and Michigan City. Among those interested in this project were some Eastern Capitalists including Daniel Webster, the great Senator from Massachusetts. Senator Webster made the long trip to Indiana and delivered a short address at Michigan City while turning over the first shovel of dirt. Michigan City experienced a temporary land boom. A small amount of clearing and grading was done south of Michigan City but it was found that the route selected required heavy fills and the work was abandoned. Bills for the work were paid in scrip which became almost worthless in the financial panic which hit the territory about this time.

The Buffalo and Mississippi Railroad ran into unexpected opposition from Chicago. The people of that city realizing they would lose their trade advantage to Michigan City, formed a lobby in the Illinois legislature and blocked the granting of a charter by the State of Illinois. This effectively closed off any hope of building westward from Indiana.

The incorporators of the Buffalo and Mississippi included William L. Latta, James R. McCord, James H. Barns, Joseph H. DeFrees, Johnston Latta and E. W. H. Ellis of Goshen. On February 21, 1837, directors William L. Latta and James R. McCord of Goshen with Robert Stewart of Michigan City, John Brown and Aaron Staunton of Laporte, met at South Bend and began active work to raise the money for construction of the road. Stock subscription books were opened to the public in March of 1837 at Michigan City, Laporte, South Bend, Elkhart and Goshen. The results were meagre and the project lay dormant. Some of the incorporators dropped out and new men took their places. The Corporation met each year and elected officers to keep its charter.

These incorporators were persistent. Some of the new members were Judge Osborne of Laporte, Judge Stanfield and Schuyler Colfax, of South Bend, John Davenport of Elkhart, Milton Mercer and Dr. M. M. Latta of Goshen. They were unable to rouse local

support but kept working, finally succeeding in getting the Indiana Legislature to forward a joint resolution to Congress. This resolution was approved January 19, 1846 (Acts 1846—p 123) but even this failed. Congress did not come through with any financial support.

A new rival appeared in the State of Michigan in a proposed line to be built by the State as the Southern Michigan Railroad. This line was to connect the same terminals as the Buffalo and Mississippi except that it would come west through lower Michigan. The officers of the Buffalo and Mississippi tried to block the granting of a charter for the Michigan Southern to enter the state at the southern bend of Lake Michigan. A hot political campaign was waged on this issue in Elkhart County. By rerouting the proposed line of the Michigan Southern into Elkhart County, making Elkhart, South Bend, and Laporte stops on the new line, the Michigan Southern was successful in defeating the opposition and secured a charter issued to them under the corporate name of the Northern Indiana Railway Co. The Northern Indiana Railroad becomes a bit confusing from this point. This was the second corporation of that name.

No less than six Northern Indiana Railroad Companies existed between 1835 and 1855. The first one was formerly part of the Buffalo and Mississippi around Michigan City. The second one was organized in 1850 and started some minor construction. In 1851, Northern Indiana # 1 again became active and the two began to squabble with the Buffalo and Mississippi. The promoters of the first Corporation organized in Ohio under the name (#3) Northern Indiana Railroad of Ohio in 1851 and in 1853, Northern Indiana # 1 and Northern Indiana # 3 merged and became Northern Indiana Railroad (4). This Corporation built the track from Toledo to Goshen, the present Air Line. In 1854, Northern Indiana # 4 took over all the rights of Northern Indiana # 2 to form one new Northern Indiana Railroad (#5). The Northern Indiana and Chicago built from the Illinois line to Chicago. In 1855 it was consolidated with the other Northern Indiana to become one line from the Indiana Line West of White Pigeon to Chicago as the Northern Indiana Railroad.

The Michigan Central had been successful in securing prior building rights from the Michigan Assembly. They could not entirely prevent the building of the Michigan Southern but did manage to have a clause inserted in their charter which provided that the Michigan Southern should not go nearer than two miles of the Indiana line until after it reached Constantine, Michigan. The Michigan Southern had changed its plans and Constantine was not in the plan. Construction stopped at White Pigeon for a consultation on legal strategy.

Judge Stanfield of South Bend wishing to secure the road for South Bend proposed that the Michigan Southern furnish him with funds and materials. He would build a new independent line from White Pigeon to the state line and connect with the Northern

Indiana. This road was built and operated as the Portage Railroad for ten years under lease to the Michigan Southern. The Michigan Assembly amended the Michigan Southern Charter ten years later and the Portage Railroad was absorbed by the Michigan Southern and ceased to exist.

As soon as the charter was granted to the Michigan Southern under the name of the Northern Indiana, the new Company began negotiations with Buffalo and Mississippi officials and finally reached an agreement transferring all the charter rights of the Buffalo and Mississippi to the Northern Indiana Railway Co. In order to keep the citizens of Goshen from blocking the project, the Northern Indiana agreed to extend a spur from Elkhart to Goshen and run at least one train a day between the two towns. This spur was built in 1852 and a round house erected at Goshen shortly thereafter. Dr. Hacılah Beardsley of Elkhart was one of the promoters and a director of the Northern Indiana from 1850 until that road was consolidated with the Michigan Southern in 1855. He saw the first Toledo to Chicago passenger train enter Chicago on May 22, 1852.

William B. Ogden was president of Chicago's first railroad, the Galena and Chicago Union, then under construction. He was also president and heavily interested in the Northern Indiana. The Michigan Central had reached Kalamazoo and the Michigan Southern had reached Hillsdale late in 1837 when the financial crisis struck Michigan. The State's funds gave out in the panic of 1837 and construction was stopped on both roads. In the late 1840's a Boston group took over the Michigan Central and started building toward Chicago. The Michigan Southern was taken over by the Litchfield family of New York and Detroit. John B. Jervis and George Bliss were the engineers in charge. Construction work had slowed when Jervis wrote Henry Farnham and offered him the superintendency of the road. Farnham refused but offered to take on the construction of the road as contractor. He had been a celebrated builder of canals and had gone into railroad construction. Farnham's offer was accepted by the Michigan Southern Board and he started building in the spring of 1851.

In 1846, the Litchfield brothers, Edwin and Elisha, organized a company with a capital of \$500,000.00 under the name of the Michigan Southern Railroad Company which purchased the Michigan Southern Railway from the State of Michigan. This was 66 miles in length from Monroe, Michigan to Hillsdale with a branch to Tecumseh of 10 miles, all laid with strap rail. This company secured a controlling interest in the Northern Indiana Railroad in 1849 and legally combined their interests in April of 1855 as the Michigan Southern and Northern Indiana Railway. Mr. Philo Morehouse of Elkhart became a resident director of the M. S. and N. I. and later became an influential stockholder of the Lake Shore and Michigan Southern. Mr. Morehouse was one of the organizers of the First National Bank of Elkhart.

On August 22, 1851 the rails crossed the State line into Indiana

and on the evening of October 4, 1851, the track gang spiked the rails into South Bend. After crossing the state line the track gangs had laid 30 miles of track in 42 days. It was a real feat of engineering accomplished with only mule and man power. The rails finally reached Chicago on February 20, 1852, three months ahead of the Michigan Central. Mr. Farnham went on to build the Rock Island Railroad out of Chicago and later headed it as president.

The *Daily Truth* describes the first train as follows: "About four o'clock on a Friday afternoon (October 3, 1851) early in the month of October 1851, a wood burning engine hauling a train of flat cars and caboose, rolled over the wooden bridge over the Elkhart River and puffed along to the foot of Main Street, which was then in the forest south of the Village proper. Many people had waited all night long in order to be on hand to welcome the incoming train."

The road ran a free excursion to White Pigeon on Sunday, October 5, 1851, with an old time coach, a box car and a number of flat cars with plank seats. The train was crowded with passengers. During the eastward trip of this special excursion train, a sudden stop was made and Calvin Dome, a boy, was hurled from the top of the box car. Badly injured, he was taken to White Pigeon for medical attention. He was brought back to Elkhart with the excursionists and died next day. This was Elkhart's first railroad fatality.

The first through train from Toledo to South Bend (end of the line) reached Elkhart on Saturday evening October 4, 1851. This train was pulled by the *John Stryker*, a wood burner built by the Amoskeag Works. The first through freight came through on Monday October 6, 1851 pulled by the locomotive *Goshen*, also a wood burner. A supply of wood was kept at the depot and was loaded into the tender by hand, by the train and engine crew. Wood was furnished by local farmers under contract. Later, Lake Shore engineers were given metal tokens good for one quarter cord of wood at any point on the system. These coins were redeemed at local freight offices of the system and were only to be used in emergencies. It was not unusual for trains to run out of fuel and visits to the nearest farm were frequently made.

Edward Hungerford in his book "Locomotives on Parade," states: "There were situated at convenient intervals along the oldtime railroad, fueling stations or depots, at which the Iron Horse halted for his fodder. Here was a task for willing hands. Sometimes the male passengers, with more or less good grace, pitched in too, and so shortened the trip and speeded their journey. But the hardest part of it all came upon the poor soul who sat (sometimes sat) at the left side of the engine cab. First he had to put the firewood—well nigh a cord of it—up atop the tender and then, piece by piece, he took it down and thrust it into the maw of the firebox. Between times he rang the bell, blew the whistle and polished up the metal work of the engine. If he worked twelve

hours he had a short day of it; more often he worked sixteen hours, or even eighteen. He was paid from forty to fifty dollars a month—no overtime—and he was glad to have the job."

It must be remembered also that there were no injectors on the woodburners of 1851. Water could be pumped into the boiler only when the engine was in motion as the pump was connected to the valve motion. If a train took the siding for a meet, an engineer had to figure enough room to move the engine back and forth to keep water in the boiler if his wait was a long one. Lubrication was provided by warming tallow on the boiler head and put in lubrication cups over the valves while the engine was in motion. Engine and train service were rugged occupations in 1851.

Building of the necessary depots, freight houses and auxiliary buildings was done by contract and in 1851 this work was progressing rapidly. Lumber was obtained easily from the surrounding forests. The contractor doing the construction for all of these buildings between Bristol and Laporte was Harlow Dodge of Mishawaka. Mr. Dodge was the father of Wallace Dodge, founder of the present Dodge Manufacturing Corp. of Mishawaka.

By late 1859 the M. S. and N. I. was a real trunk line. A note in the Mishawaka Enterprise of Nov. 12, 1859 states that, "All of the cars of the Company are now in use and some have been borrowed from the Wabash. No less than 48 loaded freight trains passed over the road (through Mishawaka) last week." Saturday, March 17, 1860 saw the record train of 54 cars come into Elkhart from Chicago. This was the longest train over the line up to that time. It must be remembered that these were link and pin days with no air brakes.

A winter time card printed in the Weekly Review, February 25, 1859 shows the M. S. and N. I. giving the following service:

Going West

Leave Elkhart Express 11:55 P. M.

Mail 3:05 P. M.

Express 7:00 A. M. Daily except Monday.

Going East

Leave Elkhart Mail 9:33 A. M.

Express 10:42 A. M.

Express 12:32 P. M. Daily except Saturday.

All other trains daily except Sundays.

M. E. Cole, Station Agent.

The time card published on April 7, 1860 shows new developments:

Going West

Leave Elkhart Express 6:15 A. M.

Mail 6:17 P. M.

Going East

Leave Elkhart Mail 10:03 A. M.

Express 11:00 P. M.

Sleeping cars accompany the night trains between Toledo and

Chicago. Patent ventilators and dusters are used on our summer trains.

F. A. Mallory, Station Agent.

The first depot was a wooden building at the foot of Main Street. A larger wooden building was built in 1855. This second building was replaced with a still larger one in 1865. This latter building was replaced with the present brick station in 1900.

Silas Baldwin settled in Elkhart in 1843. He opened with a stock of goods for P. P. Milliard. In 1844 he bought the stock and went into business for himself. In 1850 he acted as land agent for the Michigan Southern and secured the right of way from Baugo Creek to Bristol, collecting the local subscriptions himself and paying for the land. On completion of the road in 1851 he continued as Elkhart's first station agent.

Col. Alba M. Tucker came from West Hartford, Vermont in 1855 and took a position with the Michigan Southern at Tecumseh, Michigan as a clerk at \$25.00 per month. In May of 1856 he came to Elkhart for a similar position at \$40.00 per month. He was shortly after made agent to succeed Mr. Baldwin. This was a remarkable promotion since he was just past 18 when made agent. He left the city for military service during the civil war, returning to serve as County Auditor for one term. He returned to the Lake Shore as Assistant Superintendent in the '80s.

There was much dramatic rivalry between the Michigan Central and the Michigan Southern in the '60s. In May of 1860, the Lake Shore and the Michigan Central ran special trains out of Buffalo, New York to Chicago to take care of the delegates to the Republican Convention which nominated Abraham Lincoln as the presidential candidate of that party. This special train passed through Elkhart around 5:15 P. M. on May 19, 1860 arriving in Chicago at 9:15 P. M. ahead of its competitor the Michigan Central by 15 minutes. The running time was 15 hours and 15 minutes. A record which stood for years. This was accomplished in spite of two engine break downs between Toledo and Elkhart. All switches were spiked and a man stationed at each wagon road crossing an hour before scheduled time to prevent mishaps. Engineers really ran them to make up for wood and water stops every thirty or forty miles.

The first week of December 1860 brought an emergency to the new railroad. It responded nobly to the challenge. Fire broke out in the Clifton House early in the morning and had reached the stage where bucket brigades could not control it. Elkhart had been incorporated as a town in the Fall of 1858 and had not yet had an opportunity to raise money for the purchase of a fire engine. Philo Morehouse was a member of the Town Board of Trustees as well as resident director of the Lake Shore. He took the authority to order a special engine, flat car, caboose and crew to Mishawaka to pick up the fire engine "Rescue" and its Volunteer Crew. The fire engine did not get to the scene of the fire in time to be of

material assistance but this was probably the first instance of a fire engine going to the fire by rail.

The most terrific winter storm recorded in this region occurred on Friday, Jan. 1, 1864. A Lake Shore passenger train (J. E. Curtis, Conductor) left Elkhart at 7:00 P. M. Thursday, got stuck in snow drifts three times and was 24 hours late getting into Chicago. On the way in, they rescued 100 passengers from a Michigan Central train hopelessly stuck in a drift seven miles out of Chicago. Conductor Curtis and J. M. Barnes of Goshen walked the last four miles under Arctic conditions and though Conductor Curtis was too badly frozen to return, Mr. Barnes guided the sleighs that carried provisions and "liquors", back to the imperiled passengers. The road was entirely closed for over a week while snow plows worked from both ends of the division to clear it.

Jonathan Mather moved into Elkhart County in 1859. In 1865 he bought 45 acres near the corporation line and donated six acres of this ground to the Michigan Southern and Northern Indiana on which to erect their shops. He afterward laid out three additions to the town of Elkhart. Elkhart was growing "mud conscious" in 1867. The mud was so bad along Main Street that the Town Board of Trustees ordered plank walks for the West Side of Main Street from High Street to the tracks. The East Side of Main Street, from the river to the railroad was planked in 1869.

During the period from 1861 to 1869 the M. S. and N. I. purchased the Kalamazoo and White Pigeon Railroad and on September 21, 1869 acquired by lease the Kalamazoo, Allegan and Grand Rapids Railroad and established through freight and passenger service to Grand Rapids. This is the present Grand Rapids Branch.

Railway mail service had been established in the early '60s but there were no through mail cars. Most of the mail being handled at the convenience of the railroad in baggage cars. The first through mail service was established with the placing of the "Fast Mail" train on September 16, 1875. This train consisted of four postal cars and a diner on what was then a fast schedule. It was an instant success and the service has been continually expanding.

An item in the Elkhart Review of September 7, 1871 states "Twenty years ago yesterday (9/6/51) the first mail came by railroad to Elkhart. It was taken off the cars by Mr. John Cole who has faithfully performed this duty the last twenty years." This date is slightly controversial since the railroad did not reach Elkhart until later in September of 1851.

Consolidation of the Michigan Southern and Northern Indiana with the Lake Shore was completed on June 3, 1869 and the road officially became the Lake Shore and Michigan Southern. The Northern Indiana Railway ceased to exist.

The Elkhart Weekly Review of July 7, 1870 announced the breaking of ground for the new Lake Shore and Michigan Southern shops on June 30, 1870. "Preliminary plans had been published in November of 1867 by the Michigan Southern and Northern Indiana

and they had acquired twenty additional acres of land and built a foundry and rail shop during this time. A consolidation with the Lake Shore had taken place and the road became the Lake Shore and Michigan Southern on June 3, 1869. Within two months after the Lake Shore and Michigan Southern had assumed control in 1869, the eighteen stall roundhouse here had nine additional stalls, the foundry and rail shops were being enlarged and a pattern shop had been erected."

Construction of the main shop, six hundred feet by one hundred twenty-two feet, with several wings was actually started on June 30, 1870 in charge of J. P. Thompson of Adrian, Michigan. This shop was declared to be the largest in America at the time. The expected influx of employees caused a tremendous building boom. Over two hundred real estate transfers were recorded in six months. So desperate was the housing problem that the railroad hauled one house from Goshen on a flat car. Several new additions to the town were platted.

The Elkhart Review of 1871 gives a record of the progress of the new shop.

2/16/71 Rapid progress is being made toward the completion of the shop. (The article goes on to describe the equipment already installed in some detail.)

2/23/71 Orders have been given to move all the machinery of the L. S. and M. S. Co. at Laporte to this place by the first of next month. That from Adrian will soon follow. "Good times coming—wait a little longer."

2/23/71 The Lake Shore and Michigan Southern is applying the patent atmospheric brake to the engines and passenger cars of their road. By means of this a train can be stopped in running one half the distance that it can be hand braked and is entirely under the control of the engineer.

On March 8, 1871, the first carload of machinists arrived from the old shops at Laporte. Two weeks later it was announced that operations had "fairly commenced" and seventy-five men were at work with five locomotives undergoing repairs. On May 31, 1871 there were 175 men in the big shop, 250 other employees living here besides a large portion of the 375 men in train and engine service. A total of nearly 800 employees and a large payroll. Elkhart was on its way as a railroad town. Pay car days were monthly events eagerly awaited by employees and trades people.

Up to this time at least, the entire railroad shut up shop on Sunday. No trains moved on that day. The Review reports on April 6, 1871—"The thirty stalls at the roundhouse were full with locomotives on Sunday last, five stood outside, making in all thirty-five locomotives standing at this point over Sunday."

History does not record all of the new men coming into Elkhart with the new railroad shops. It does give a few.

Jacob Zook entered employment with the Lake Shore & Michigan Southern in the Laporte shops in 1855. Moved to Elkhart with

the first crew of shop men from Laporte in 1871 and later became foreman of the Carpenter Shop.

Lewis H. Ley started at Adrian as a boilermaker in 1852. Came to Elkhart in 1871 as a boilermaker in the new boiler shop and was made foreman of this shop in 1873.

John C. Stuck came to Elkhart from Three Rivers, Michigan in 1869 and hired out as a molder in the wheel shop. He became assistant foreman in the molding room for car and locomotive wheels.

Thomas Wilcox came with the Lake Shore in 1853 at Adrian Shop. Came to Elkhart when the shops were transferred as a lathe operator. In December of 1903 he was the oldest man in shop service at Elkhart.

The railroad secured quite an artistic genius in Mr. Charles Salkeld. Mr. Salkeld's duty was the ornamentation of locomotives and cars as they went through the shop. Most of the headlights were decorated as well as some of the cabs on the engines. Coach interiors were lavish. The Review says "To appreciate what we say about him, his specimens must be seen."

The Review of May 25, 1871 gives a list of men on duty in the shops and yards at Elkhart on May 1, 1871. We cannot give all of them here as it was a list of several hundred men. Here are the principal ones:

Shops	William Hill	Master Mechanic		
	R. Quaife	Foreman		
	George Coburn	"		
	C. J. Quetil	Draftsman		
	J. H. Snyder	Time Keeper		
	C. H. Leonard	Clerk		
Black Smith Shop	D. Frazier	Machinist	and 100 men	Total—106
	A. Price	Foreman		
	H. Letter	Springmaker		
	F. Gemble	"	and 22 men	Total— 25
Boiler Room	James Downing	Foreman	and 19 men	Total— 20
Cooper Dept.			6 men	Total— 6
Carpenter Dept.			9 men	Total— 9
Paint Shop			6 men	Total— 6
Foundry	F. L. Collins	Foreman	and 33 men	Total— 34
Rail Shop	D. Brennan	Foreman		
	John Casat	Engineer	and 49 men	Total— 51
Round House	John M. Sanborn	Foreman	and 39 men	Total— 40
Telegraph Dept.	J. Babcock	Foreman		
	S. P. Wilcox	Operator		
	E. P. Wood	"		
	S. T. Gage	"		
	Chas. Johnson	"		Total— 5
Car Inspectors	B. S. Enos	Foreman		
	Fred Shafer	Inspector		
	S. Ducolon	"		
	Chas. Watson	"		
	C. Wickwire	"		
	Jeff Bender	"		
	Jacob Labor			Total— 7

Track Dept.	Wm. Theis	Foreman	and 14 men	Total— 15
Mechanics	William Gravitt	Master		
	J. Hollis	Foreman	and 18 men	Total— 20
Section Men	Christian Theis	Foreman		
	John Werly	"		
	S. G. Weber	"	and 9 men	Total— 12
Building Dept.	J. Jacobson	Foreman	and 40 men	Total— 41
Yard Dept.	S. D. Bancroft	Yardmaster		
	E. Marber	Baggageman		
	E. Howland	"		
	E. Robinson	Car Recorder		
	M. Flint	Warehouse		
	B. O. Manchester	"		
	Henry Woolworth	Yardforeman	and 12 men	Total— 19
				Grand Total—416

There were nearly as many more in train and engine service. It was Elkhart's largest industry and the pay cars took several days to make the monthly pay-off.

The great Chicago fire of October 8, 1871 boomed both the railroad and brick industry in Elkhart. There were several brick yards of considerable size in and around Elkhart at this time. Contractors from Chicago came down and bought the entire production of the local yards, shipping into Chicago by train load lots for the rebuilding of Chicago.

In 1871 the entire road was single track from Buffalo to Chicago. There were four passenger trains operating each way between Chicago and Elkhart with three each way over the Air Line and Old Road between Toledo and Elkhart. Freight traffic was heavy. The Board of Directors of the Lake Shore ordered the double tracking of the line from Buffalo to Chicago in the Fall of '71. The double tracking between Toledo and Elkhart to be over the "Air Line."

The Review of 8/24/71 reports that—"Freight is increasing so rapidly on this road that all the cars of the Company are employed and yet this is not enough. Engineers report passenger trains so heavy that they can hardly make the time."

There was indeed a car shortage and the Bristol reporter states that the apple growers of his territory have at least twenty car loads of apples to ship and no cars available.

The heavy passenger trains didn't "Stump" some of the boys. Ed Benham with #69 came from Toledo to Elkhart in three hours and forty-two minutes on Sept. 28, 1871. He made twenty-four stops on the way and with hand brakes too. F. A. Casey on the Grand Rapids Branch made four miles in four minutes and fifteen seconds with a low wheeler engine. Pretty good time for the "Pea Vine."

Labor unions were coming into the picture in the early '80s. Elkhart Division # 19, O. R. C. was formerly Daniels Division # 19 organized on Dec. 18, 1881 with 19 charter members. B. of L. E., John Hill Division # 248 was organized in 1884 with 50 charter members. J. H. Cainon was the first Chief Engineer,

A. A. Bardeen, Secretary and D. A. Fleming, Treasurer. B. of L. F. and E., Prospect Lodge # 162 was organized June 3, 1883 with 21 charter members. A. G. Amsdem Lodge # 23, B. of R. T. was organized on August 7, 1884 with 21 charter members. The International Association of Machinists, Hoosier Lodge # 163 was organized February 26, 1900 with 57 members. The Switchmen's Union of North America, Elkhart Lodge # 151 was organized January 21, 1904 with 16 members. These organizations are still active with a large membership and exert a deciding influence in labor affairs in the city.

Goshen and Middlebury were looking for an outlet to the Northeast and in 1888 voted aid to a road which was to run from Jackson, Michigan to Danville, Illinois through Goshen and Middlebury. The line was built from Battle Creek, Michigan to Goshen and placed in operation in January of 1889. The company failed and the Lake Shore secured control just one day before a deal to dispose of it to the C. W. and M. was to have been consummated. This is the present G. and M. Branch operated out of Elkhart via Sturgis and Goshen.

The Elkhart Truth reported early in 1891 that "Mr. Bucklen contemplates building the Elkhart and Western between this place and Mishawaka this summer. This will give Elkhart an opportunity to connect with the Grand Trunk railway and an effort should be exerted to induce that railroad to construct an Air Line from some point East connecting with the Elkhart and Western. The advantages of such a connection can hardly be overestimated in view of the fact that they will give a competing line East and West, another express company and cheaper passenger and freight rates."

The South Bend Weekly Tribune reports on June 6, 1891: "Reports show that nearly all of the right of way for a railroad between Elkhart and Mishawaka has been obtained by the Elkhart and Western Railroad Company. The following officers have been elected: H. E. Bucklen, President; J. R. Beardsley, Vice-President; E. C. Bickel, Secretary-Manager; Stafford Maxon, Auditor; C. W. Winchester, Treasurer; Directors are H. E. Bucklen, J. R. Beardsley, J. L. Brodrick, E. C. Bickel, W. J. Davis, H. C. Dodge, Stafford Maxon, J. P. Primley, Charles H. Winchester. The report of the financial condition of the company shows that it has the sum of \$39.12 on hand.

Construction was started in 1891 beginning with a connection with the C. W. & M. and running to the St. Joseph River. A passenger station and freight station were built along the Elkhart River behind the Bucklen Hotel. These buildings are still standing although long since used for other businesses. In 1893, passenger service was regularly established between Elkhart and Mishawaka with two trains per day. The running time was twenty-five minutes and the trains made connections at Mishawaka with the Grand Trunk for Chicago and Eastern points and the Street Railway for South Bend.

The Elkhart Truth of 1895 shows a schedule of trains for the Elkhart and Western as follows:

# 1 Going West	Leaves	6:30 A. M.
# 2 Coming East	Arrives	8:00 A. M.
# 3 Going West	Leaves	12:40 P. M.
# 4 Coming East	Arrives	3:35 P. M.

C. W. Fish was Ticket Agent. Darwin F. Coe, Traffic Mgr.

One of the old time "Hog Heads," Jess Hout, states that he can recall leaving Mishawaka many times with forty or fifty passengers for Pleasant Valley and Elkhart. The engine was a small 4-4-0 American Type. The Elkhart and Western established a perishable car service between Chicago and Elkhart via the Grand Trunk with overnight delivery out of Chicago for perishables. Considerable produce came to Elkhart over this route. The Elkhart and Western built no further than Mishawaka and was finally purchased by the Lake Shore. It was a great factor in the building of both Elkhart and Mishawaka and narrowly escaped being a part of the "3 I" empire which was giving the Vanderbilts some competition in the late '90s.

The first engine on the Elkhart and Western was the number one, a small eight-wheeler, bought second handed from the Northern Pacific. Various engines were later assigned, the # 64 taking after the # 1 proved too small to handle the business. This engine was leased from the Lake Shore and was given periodic service at the Lake Shore Roundhouse. The records show # 78, the 1083 and 1089, all American types. After passenger service was abandoned the Lake Shore assigned six wheel (0-6-0) switchers both to the Mishawaka run and to the switching position in North Elkhart. These have long gone and heavier power is in order. Even 2800s (L3) make the run with solid coal trains to the Twin Branch Power Plant at Penn.

Heavier motive power burning coal had been replacing the old wood burners and the Lake Shore was beginning to replace the American Type 4-4-0 eight wheelers with 4-6-0 ten wheelers in the '90s. One newspaper (South Bend Weekly Tribune 8/22/91) ran an editorial on the situation stating that these heavy passenger engines were doing some terrific pounding of the track, damaging track and bridges. The editorial questioned whether the saving in cost of trains, men and fuel outweighed the damage to track.

November 1, 1891 also saw a momentous step in railroading. On that day all Lake Shore crews were compelled to carry standard watches. A note in the paper says "already one conductor has been pulled off at Elkhart for failing to have the required time piece." The next paragraph stated "The Lake Shore pay car stopped yesterday." That was a popular event on the Lake Shore.

On October 24, 1895 the Lake Shore decided to compete against some of the famous English trains for the "Fastest Train" title and on that morning around 3:00 A. M. started a special out of Chicago to Buffalo. The train was to be timed from the east end of Chicago Yards to the yards in Buffalo, a distance of 510.1 miles.

The run was made in 470 minutes 20 seconds, an average of 65.07 miles per hour. The highest speed attained at any point was 92.32 miles per hour on the Erie Division.

All preparations were carefully made. The 597, with Mark Floyd as engineer was assigned to the Western Division. The 599 and engineer Demetris M. Luce from Elkhart to Toledo. The full account of this famous run appears in the Elkhart Daily Review of October 25, 1895 and gives the details: "In an incredibly short space of time that train seemed to be tearing through space at a rate that would put many of the regular express trains to shame. There was no jar, no jerk, but the rattle of the wheels on the rails told plainly that Floyd had "thrown her wide open," and was prepared to make good his boast of seventy-five minutes to Elkhart. Supt. Newell sat with his face glued to a window with a heavy blanket wrapped around his head to keep the lamplight from interfering with his vision. (He was the official caller for the time keepers, calling the stations as they were passed. Oil light didn't show up like modern ones.) Floyd had loosened her up a trifle and by the time Pine was reached had almost struck a mile a minute gait. When Dune Park was reached it traveled at the rate of sixty-five miles per hour and the railroad men began to smile."

"Their smiles grew broader when a speed of sixty-six miles was indicated at Chesterton, but from Chesterton to Otis there is an eight mile hill, with a grade of twenty-nine feet to the mile and Floyd could not get above the sixty mile gait. He dropped below that going the next five or six miles but when Laporte was reached he was making his top notch of sixty-six miles per hour. Just about this time it became evident to the riders that the engine needed all the steam it could make to carry it forward, for that cheery article had been shut off in the train. Overcoats were donned and gloved hands held the stop watches until the sun came out and warmed things up a bit. South Bend to Elkhart was made in less than fifteen minutes."

"Yardmaster Henry Ziesel and inspector Dick Enos set a record of two minutes and eleven seconds changing engines and getting the train going. The men worked with oil lanterns in those days. Dave Luce pulled the throttle on # 599 wide open and lit out for Toledo. Great things were expected on the Toledo Division. One of the eccentric rods on the 599 became heated and fireman Gamester stood on the running board, leaned over and "dosed her" liberally and often with valve oil. Engineer Luce reached a speed of 72½ miles per hour just East of Edgerton and missed his schedule by 20 seconds. One railroader said "The Company would rather burn up the whole locomotive than make a failure on this trip."

Engineer Mark Floyd came from the East after seeing service in the Civil War. He came with the Lake Shore in 1871 as a promoted engineer from the Maine Central. He was assigned to passenger service in 1880 handling many of the fast trains.

Engineer D. M. Luce started in January 17, 1866. His first

run was from Toledo to Detroit firing the John Stryker (#67) for his father. (This engine pulled the first thru passenger train from Toledo to Elkhart in 1851.) He was promoted to passenger service in 1885 and was known as one of the most particular engineers on the road.

Both of these men were especially picked for their "running" ability. The engines were Brooks Eight Wheelers (4-4-0) with 72 inch drivers. The running time on the Western Division was 85 minutes, 26 seconds, 87.4 miles, an average of 61.38 miles per hour. Toledo Division time 124 minutes 35 seconds, an average of 64.24 miles per hour.

During 1891 the double tracking of the main line had been going on West of Elkhart with extra gravel trains working out of the Twin Branch Gravel Pit. The double track between Elkhart and South Bend and between Terre Coupee and Burdick was opened during the week of November 14-21, 1891. Many gravel trains were still operating from Twin Branch to Dune Park for the double tracking in that territory. There were manual block stations at Osceola and Twin Branch on a day and night basis, the operators working twelve hour shifts.

Freight was heavy during the year 1891. In reporting a bad wreck at Mishawaka on March 21, 1891 the South Bend Weekly Tribune reports the trains involved as two freights, First Section # 50 East, Engine 65, Engineer Dan Burroughs, Seventh Section # 47, West, Engine 531, Engineer Cronk met off Dodge Curve with a "Great Crack." The Eastbound having overlooked a meet at Mishawaka. Freight trains seldom run in seven sections in these days.

In 1893 the Lake Shore was making a serious bid for passenger traffic from the East to Chicago for the Columbian Exposition. The Exposition Flyer was put on with an eighteen hour schedule between New York and Chicago. Some of the old timers can recall the two engines assigned to this train, the # 94 and the # 160, high wheeled American Type engines. The Flyer had rights over all trains on the road and instructions to make up the time. This train had an almost instantaneous success and later became the Twentieth Century Limited with a twenty hour schedule. The eighteen hour schedule proved too hard and expensive to maintain at that time. Air brakes on passenger trains were just coming into the picture to make this speed possible. Freight trains had air on the engine only and the rest was "strong arm work" by the crews on hand brakes.

The Indiana, Illinois and Iowa was building north from Kankakee in 1892 and had reached Knox, Indiana. Several surveys were made, one being via Plymouth to Goshen, the other into South Bend for a connection with the Lake Shore or a possible connection at Mishawaka with the Elkhart & Western. The Plymouth route was finally dropped and the line built into South Bend. An effort was made to extend the road into Elkhart via the Elkhart and Western. This went so far that the City of Mishawaka passed an

ordinance granting permission for the road to build on the South Bank of the St. Joseph River to a connection with the Elkhart and Western. Goshen was finally to be reached through a proposed interurban electric line between Elkhart and Goshen.

The "Three I's" never built beyond South Bend but became an important belt line around Chicago and a moneymaker. The Lake Shore finally bought the controlling interest in the road and the line was officially turned over to them on January 2, 1902. A special train of three cars went over the "3 I's" on Wednesday, January 29, 1902, bearing an inspection party of Lake Shore officials. Effective February 15, 1902, a change of officials became effective and the Superintendent's Office at Kankakee, Illinois was abolished and moved to South Bend. F. C. Raff became General Supt. at South Bend, J. H. Malone, Supt. of Telegraph at Kankakee, Illinois with James W. Dutton as Train Master at Kankakee. All dispatching of trains was handled from Kankakee.

Embarrassing incidents took place in 1902 just as they sometimes do nowadays. The South Bend Weekly Tribune of February 22, 1902 reports "under an Elkhart Dating," "Local officials of the Lake Shore were much chagrined over a mishap which occurred to First # 3 at Kendallville about five o'clock this morning (Feb. 18, 1902), when the front trucks of engine 601 jumped the rails at a cross over because, it is claimed, cinders and ice clogged the frog." This train carried the private car of William K. Vanderbilt, enroute to South Bend for a trip over the "3 I." Engineer Sparlin was moving about eight miles per hour when the engine derailed. He was crossing over to the East bound main to run around a delayed Westbound freight. The train was brought in by a substitute engine and lost only an hour and thirty minutes. The article goes on to state "A local division official remarked, 'the last time William K. went over the line we froze him and this time we nearly ditch him. He'll think we're a lot of chumps out here.'" History does not record what Mr. Vanderbilt's thoughts were which is probably just as well.

Prior to 1903 the eastbound yard was around Tenth Street with the westbound in the vicinity of Oakland Avenue. There was a transfer track between the two yards. The old coal dock stood east of Tenth Street and the cars were pushed up a heavy incline to the top of the dock for unloading. The old timers recall there was only one engine used for this job and it was a pretty light engine. The crew would take hold of a couple of cars of coal, pull back to Oakland Avenue and make a run for the dock. They didn't always make it and had to try over again. The Old Middle Ground was near the present passenger crossover and the locals were handled from Tenth Street Yard. The yard office of "BC" Office was on the north side of the tracks just east of Calvert's Coal Office. The old timers still recall with pride the daily "Horse Train." This came out of the stock yards with five or six horse cars and a caboose, a passenger engine, and a fast schedule. The inbound crew would drop their caboose as the train pulled in. The

yard crew would put on the Michigan Division Caboose while the head end changed engines. Five minutes did the job and the fellow who took longer than that explained why.

Fast freights were really fast in those days. Number 60, the eastbound stock run would often run in five or six sections of 30 to 35 cars of livestock. Number 62, the perishable and merchandise run ran in four or five sections with 35 to 45 cars. The engines in use were Brooks Consolidations (2-8-0) later used for yard power and freight power on the Grand Rapids Branch. The American Locomotive Company Consolidations (2-8-0), the 5600s, came in around 1906 with longer trains and more air brakes.

L. J. Hasbrook, now on days at "B" Tower Main Street is another old timer with memories. He started down East in June of 1898 and came to Elkhart in December of 1902. He started to work on the spot where "B" Tower now stands. It was a shanty then from which the operator and switchtender controlled train movements to and from the Old Road and Air Line by pole targets and hand signals. The switchtenders working with him were "Sandy" Eixenbeiss, John Parks and "Bill" Posey. All dispatching and train order work was done by telegraph and manual blocking and was in effect between Bristol, Goshen and Elkhart. All passenger trains were manual blocked but freight trains were allowed to follow each other at ten minute intervals. Passenger train # 22, the Lake Shore Limited, was fitted with a steam generator for electric lighting. This was in the baggage car. A plug was put in on the south side of the track so that city current could be used while the engine was changed. No engines ran through Elkhart in those days. All engines changed here. Elkhart yard was a busy place. "Hazy" moved out to the yard when the "Hump" opened with a box car for a telegraph office. He came back to "B" when the new tower was put in service in 1907. He's still there keeping a finger on the busy flow of traffic in and out of Elkhart.

Jesse (Jap) Lippincott is another "old timer" with memories. His father, Frank Lippincott, was an enginer and a career railroader before him. He was running passenger before "Jap" started his own railroad career. "Jap" remembers a few things about the railroad even before he started to work. He says "I was always interested in the railroad. I was 13 in 1893 when the old 999 and its train, The Empire State Express, and an English train came from the East for the Columbian Exposition. The trains were towed into Elkhart and shoved in on the Old River Track east of Main Street for the night. A couple of other boys and myself went over to see the trains and I measured the big drivers on the 999, just seven feet and one inch high. I can remember the trains coming back East. They came under their own power. Mark Floyd was the engineer on the 999 and Arthur Wheaton pulled the English train. It was a bitterly cold and snowy day in October and I can still see Engineer Wheaton jump off the open cab of that English engine. He wore a big overcoat but was nearly frozen. The English

engine had a small cab, all open with no curtains and only one small seat for the engineer."

"The cars were about half and half link and pin and automatic couplers. There were several types of automatic couplers in use, some of them not too satisfactory. The automatic couplers were fitted to work with the link and pins by cutting a slot in each knuckle with a hole going down through to insert the pin. Each crew always carried a few extra pins and often had a few hid somewhere close as the pins would drop out in the snow and would just disappear. The last link and pin equipped cars went through Elkhart on December 13, 1902. This was the last day they were permitted to be used. There were four of these cars chained together ahead of the caboose on the 'Dairy' headed for Ashtabula Car Shop.

"The distant signal on the Air Line was at Prairie Street and was worked with a set of wires from the operator's shanty at Middlebury Street. No distant signal was used on the Old Road since it was a straight track. A two armed V type signal was used as a home signal with different positions to govern the Air Line and Old Road trains. This signal was controlled by the operator at Middlebury Street. The day operator was Bill Thieman and the night operator, Bert Baker."

"Trains on double track ran 'left handed' instead of right handed as they do now. Passenger engines waiting for their change were kept in the 'Beer Track' on the Stub which ran from Main Street to Willard. Engines coming in on westbound trains were cut off and run across Main Street on the Old Road. After their train had left town they were backed past the depot to the old roundhouse on the north side of the Main, west of the depot."

"When I started on the House job the Freight House only had one track holding ten cars. When the yard was enlarged in 1903, old track # 11 was cut in as track # 2 at the House. The Old Team Track is still there just as it was in '93. Freight trains were hauling 1340 tons. No air brakes, some engines had steam brakes. Freight cars had hand brakes on one truck only. The eastbound yard had seven tracks, inbound freight trains from the west crossed into the yard at Tenth Street. Westbound freight left the yard at 17th Street with the road crews operating their own switches. It was necessary for the train to pull out on the Main, stop, close the yard switch, then proceed. If they were shoved out, the yard crew on the pusher closed the switch for them."

"I can remember the first eastbound run of the 'Twentieth Century Limited' on June 15, 1902. Millard Fleming was the engineer of the first run out of Chicago. My father, Frank Lippincott, was engineer on it the second day, June 16, 1902. I am not sure about the first conductor but I think it was Harry Seigler."

"I remember when the yards were opened in November of 1903. Tim Dawson came down from Toledo as Assistant Supt. at Elkhart to open the yard officially. He was stationed at Elkhart and had jurisdiction over the yard and the Grand Rapids Branch.

We had a variety of engines working in the yard, some McQueens, Masons and a few Standards built in the Lake Shore shops. Most of them were eight wheelers but a few ten wheelers were showing up. The 600 to 610 series were slide valve engines, the 611 to 650 were fitted with piston valves. The 611, D. A. Fleming, engineer, was making a test trip. It was the first piston valve engine. They were going east on # 32. A box had been fitted on the front end of # 611 for the test operator. As they were pulling into Air Line Junction they met engine # 70 coming out with a coal drag. The test operator saw the # 70 in time to jump and was only slightly hurt. The impact put the # 70 right up on top of a car of coal. They left her on top of the car, put it in a train and sent it to the Elkhart Shops that way. The Elkhart wrecker took it off the car."

"The worst accident that happened in which I was involved was early in the morning of September 2, 1909. Our shove engine was the 4596, engineer John Lane. I sent the engine back to shove up the 'Coke Train.' Cody Metcalf, 'Buster' Brown and Brush Thompson went back with the engine. It was foggy and the boys got on top of the cars to pass hand signals. The engine took the slack and whistled off. I gave them the 'Jack' to shove. By then the fog was pretty thick and I heard them coming up the hill at a pretty good speed. I had one car of milk for # 15 ahead, then 36 cars of coke for # 3, a clear track, 14 cars of coke for Porter then 35 more for # 3. I threw the 'Jack' to stop and the men on top passing signals got down on the ground and started back to give the signal to the engineer. He saw them swinging down and thought that it was an emergency and stopped right then. About 50 cars broke off and started to run over the 'Hump.' I got every man on the cut but the hand brakes wouldn't hold them. They went clear out at the other end of # 15 and into the side of the South Bend 'Jigger' which was coupling up its air on the lead ready to leave town. When the cars stopped they had sliced off the sides of two cars on the 'Jigger' and the car of milk was almost buried on the south side of the lead. Nobody got hurt."

"Jap was promoted to Yardmaster on March 3, 1919, went back to conductor on May 27, 1927 and retired on June 30, 1945. He too, has seen the transition from flat to hump, to flat switching."

Construction of the new gravity yard or "The Hump" as it was locally called began in June, 1903 and all summer long the grading operations and the building of the three tunnels over Larue Road (now State Road # 19) and the final laying of track were Sunday sightseeing "musts" for Elkhart residents. The yards were formally opened on Nov. 15, 1903 with General Yardmaster Joseph E. Derby in charge. Elkhart became a greater factor in Lake Shore operations. A large car shop was built between the Humps and was one of the best equipped car repair shops in the United States. A new tower "WG" was built at the west end of the yard near Elkhart County Road # 1. This was the entrance to the new yard for all freight trains as well as the clearance point

for all westbound freights. New buildings were necessary to handle the new yard and increased business.

The freight house as rebuilt was a real addition to the freight facilities at Elkhart. Three tracks were in use with a capacity of 45 cars of merchandise at one setting. It was regular practice to make a noon "pull" and reset and later cars brought in by the locals were set after six P.M. and worked with a night crew. The present house as rebuilt after the fire of 1945 now "spots" 28 cars. The employees at one time numbered around eighty men. It now has about one third that many.

Prior to 1904, engine crews worked wherever they were assigned. The roster at Elkhart covered,—Toledo Yard, Air Line, Old Road, Detroit Branch, Fayette Branch, Grand Rapids Branch and the Western Division. An extra man might be called for a run to Toledo, pick up a job on one of the branches and might be away from home for days. In 1904 division seniority was established with separate rosters for the Toledo and Western Divisions. The men were given their choice of divisions and from that time on worked only assignments on their respective divisions. It was a revolutionary step in railroading.

The Lake Shore Book of Trains (Time Table) for 1905 shows a cut of the Twentieth Century Limited headed by a "high stepping Brooks Ten Wheeler" and five ornate wooden coaches. The time table described it as the "world's fastest long distance train," Chicago to New York in twenty hours. In this train from the buffet car ahead to the beautiful observation car on the rear, nothing has been left undone which can possibly add to the safety and pleasure of the traveler. The train is lighted and ventilated with the consolidated "Axle Light" system of electric light and fans. Each section has its own reading lamp in addition to others. It goes on further to state "when the Twentieth Century Limited train recently made a run on the Lake Shore Railroad of 133.4 miles from Toledo to Elkhart in 114 minutes, probably none of the passengers gave thought to the real meaning of such a magnificent speed performance. In order to accomplish this feat a speed of fully 85 miles per hour had to be maintained for considerable portions of the distance. With a modern passenger train such speed can be attained with safety only when road bed, track, equipment, discipline of employees and other operating conditions are about as perfect as human skill can make them."

The time table of 1905 lists such familiar train numbers as: # 6—Limited Fast Mail, # 10—Chicago, New York and Boston Special, # 26—The Twentieth Century Limited, # 16—The New England Express, # 14—The Eastern Express, # 22—The Lake Shore Limited, # 28—New York and Boston Express, # 32—Fast Mail with westbound schedules to match. Running time from Chicago compares favorably with present day schedules. # 26, two hours and ten minutes, # 6, two hours and twenty minutes. Some of the slower trains took two hours and thirty-five or forty-five minutes. Most of the slower trains making five stops or more.

This in the day of manual block, telegraph dispatching and hand fired engines. Trains were frequently in several sections particularly the Century and the Lake Shore Limited. Elkhart was an eating station for several of these trains in the pre-diner era and the time card lists several "20 minute for lunch" stops. Any of you old timers having tried to grab a lunch at one of these depot "beaneries" has an experience long to be remembered.

Evidently passengers had been carried in the cabooses of local freights and this was becoming a nuisance to the company. The 1905 time table says sternly: "This railway does not wish to carry passengers upon way freight trains and does so only as an accommodation to the public . . . Tickets must be purchased before taking these trains, cash fares will not be accepted for passage."

Elkhart Yard had been under the jurisdiction of the Toledo Division for years. It was finally placed under the Western Division in 1910. Ever since the second main track was built in 1891, the road had been run "left handed." This was changed to right hand operation when the Western Division took over. The change of operation was made division by division at the rate of one division a year since it was necessary to reset all the signals. The Toledo Division changed over in 1911.

The Michigan Division was established October 10, 1918, with headquarters at Elkhart. This division was comprised of the Old Road, Grand Rapids Branch, G. & M. Branch, Monroe Branch and Fayette Branch. E. R. Bissel was Superintendent, W. G. Hamaan, Trainmaster, W. F. Fuson, Chief Dispatcher and J. E. Ernst, Chief Clerk. A dispatchers office was established on the second floor of the depot with dispatchers O. C. Seivers, Ed Gangwer, R. M. Waite, J. M. Kane, W. E. Stearns and Harry Hale. This division was abolished on February 1, 1930. It became part of the Toledo and Lansing Divisions. Part also went to the Michigan Central. Dispatching was taken to Toledo and the office closed.

Motive power gradually changed with the times. All of the early engines were American Type eight wheelers until the late '90s. This type engine was used for all purposes, freight, passenger and yard switching. There were some differences in wheel diameters for the different services but that made little difference. This type engine was a work horse. Along in the '90s, wood fuel grew scarce and coal came in since railroad had been built to tap the mining territories on the line. Ten wheelers came in around the close of the last century, most of them being Brooks engines from Dunkirk, N. Y.

R. P. Kindig, engineer, states "I can remember the 1088 and 1089 (American Types). We used them on the E. & W. The E. & W. used to run specials from Jackson Street depot to Barney's Race Track (now the Elk's Country Club). We hauled a lot of passengers out of there too. I can remember going over to Mishawaka and doing the switching with those engines. They had 82 inch drivers and were hard to work with. The caboose on the E. & W. was a little four wheeler and rode pretty hard. We used to

'open her up' after we left Mishawaka and sometimes had the train crew pretty scared. Those little cabooses jumped about pretty bad when you got up speed."

The old ten wheel switchers, the 4500's, came to Elkhart between 1905 and 1906 for shove engines. Several six wheel switchers came into service later, the 4389 and 4391 being the regular engines on the Passenger Pony around 1913. The 720 and 722, eight wheel switchers, came to Elkhart in 1917. F. L. Lauver was the first fireman to handle one of these in yard service. Brooks Consolidations (2-8-0) came in around 1902 and 1903. They were later replaced by larger engines of the same type around 1906. These were the first freight engines with outside valve gear and piston valve. The Brooks engines finally wound up as yard power at Elkhart and the Grand Rapids Branch, the 5600's on the Kankakee Line. The "Mikes" (2-8-2) came in shortly after 1910 with longer trains. These were standard freight power when World War I broke out.

The first "L" engines came in late in 1916 with the 2500 and 2600 series. They were hand fired and a real test of a fireman's ability. A few stokers showed up in passenger service in 1918. Pacific passenger engines (4-6-2) were hauling all passenger trains about that time and the / a / 4732 was the first attempt at streamlining. She was given a streamlined cab and assigned to the Century. The Mallets arrived for "Hump" power around 1913. These were the largest engines in service at Elkhart. They were compounds with low pressure and high pressure cylinders and Street Stokers which didn't stoke so the boys hand fired them. Their top speed was twenty miles per hour. The 5900, 5898, 5899 and 5901 were in regular use until the Humps were taken out in the '30s. They were 0-8-8-0 engines. They tried to use them to pull trains with when they were sent to Collinwood. They stuck about everything on the road. The boys couldn't keep them hot in road service.

Some of the United States Railroad Administration Mikes (2-8-2), the old 1800's, showed up in the early '20s. They were assigned to the Kankakee Line. A few made trips on the Western Division. They were later assigned on the Old Road and Grand Rapids Branch. Only a few are still in service. These engines were stoker equipped. The Company was further developing the "L's" and engineer Gust remembers that he made the first trip as a fireman, with J. E. Silkwood, engineer on the 2585, just out of the shop all decorated up with water pump, feedwater heater and booster. He thinks this was in 1926.

The 2803 was the first "L 3" into Elkhart coming down from Toledo, Traveling Fireman Marty Lee riding along to see that the boys got along all right. The 2803 was so long that they had to cut off the tank, turning first the locomotive, then the tank. Extension rails were added to the table shortly after to take care of this feature as it was quite a job to cut the engine in two.

World War I worked Elkhart Yard to capacity. The yard held out freight trains for hours. Track room was at a premium. The "Humps" were working to capacity with 15 to 18 riders on each trick. The eight hour shift had replaced the 12 hour day and the 16 hour law had gone into effect for train service. The shops and roundhouses were severely taxed to keep motive power in service and rolling. But Elkhart came through, even doing special shop work and switching to relieve congestion at other points. Business continued good until the late '20s. A new yard was built west of Whittakers Crossing (E Yard) and a new tower "WG" at County Line. Both went into service in 1924.

On September 1, 1929 the Big 4 freight house was closed and all freight work, both L. C. L. and carload, was handled through the New York Central freight house at Main Street. The office staff consisting of H. L. Endicott, Agent; R. T. Flenar, L. R. Leonard, W. M. Lines and Nina Verbarg were brought over to the New York Central with Mr. Endicott becoming Assistant Agent. On October 16, 1931 all the Big Four trains came from Goshen to Elkhart and the reverse direction over the Air Line into Elkhart Yard. This closed the Big 4 /21/ from Elkhart to Niles and this section was eventually torn out. Big Four trains, both north and south, were made up in the N. Y. C. Yard, the northbounds going to Benton Harbor via South Bend over the Western Division, Michigan Central from South Bend to Niles and their own line from Niles to Benton Harbor. It was necessary for a Big Four crew to carry five time tables and five switch keys.

Consolidation of the Big Four took off the Passenger Pony at the depot. This was a three trick engine which in addition to handling the passenger work made the Big Four interchange once each trick. The interchange track was between McDonald Street and Indiana Avenue between the Air Line and the Big Four and it was often quite a job to shove these cars in from the interchange between passenger trains when traffic was heavy, the interchange often running 25 to 35 cars.

The Hudson type (5200's) showed up in passenger service in 1928 and had almost replaced all the old Pacifics by 1930. These proved a fine engine and equal to all that was asked of them, even handling some assignments in freight service in emergencies. The 5200's ran up some startling mileage performance figures. L-3's were the heavy freight power and freight train time on the division was cut almost in half from the schedule of the pre-1920 period. Even drags were going over the road without overtime.

Many improvements in motive power and equipment have taken place since the late '30s. The Century was streamlined complete with streamlined locomotives. Automatic train control has been installed. Heavier freight power came in climaxing with the 3000 series Lima L 4's (4-8-2). The Yard was floodlighted with a consequent decrease in personal injuries. Loud speakers were installed in late 1941 to give better and quicker communication between the yards. All of these helped handle war time business.

After World War II the railroad took a deep breath and an inventory. More improvements were planned and started. The freight house was a fire casualty in 1945 and was rebuilt. New brick yardmaster's offices were built at Oakland Avenue and the eastbound in 1946. The new 6000 series Niagaras were in service and new streamlined passenger equipment placed in service. The "Droning" sound of the diesel started to be heard. Teletype circuits were installed at "Rt" in June of 1947 replacing the operator's "Bug." A new dial telephone system was installed to replace the old switchboard at the depot. New "bay window" cabooses are gradually replacing the old style equipment. A new "BC" office is in process of construction to replace the temporary quarters.

The railroad isn't standing still. It is continuing to improve to serve you, the public, better in the next one hundred years.

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The Origin of Locomotive Class Names

By G. H. GASKELL

At the beginning of the Twentieth Century, F. M. Whyte, the Mechanical Engineer of the New York Central and Hudson River Railroad Company, introduced what is now known as the Whyte Notation for the classification of locomotives. Previously such names as "Jenny Lind," "Columbia," "Atlantic," "Pacific," "Mikado" etc. had been used by railway officials in the U. S. A. to distinguish the various types of locomotives—a memory-testing method when compared with Whyte's easy-to-remember classification by wheel arrangement. The names were not chosen at random, and it is the purpose of this article to give some information on the origin of these names.

A similar notation to Whyte's is used in France, but the numerals denote axles instead of wheels, so that 4-4-0's and 4-6-2's are designated 2-2-0's and 2-3-1's respectively. In Germany the leading and trailing axles (or wheels) are denoted by numbers, and the driving axles (or wheels) by letters, so that a 4-4-0 becomes 2B and a 4-4-2 becomes a 2B1. The leading and trailing wheels are sometimes termed "carrying wheels," but all wheels are "carrying" wheels, and it is therefore incorrect to term the leading and trailing wheels as carrying wheels. Originally the German method of classification was by means of a fraction, in which the numerator was the number of driving axles (or wheels) and the denominator was the total number of axles (or wheels). However, this did not differentiate between leading and trailing axles, so that the same fraction could represent different wheel arrangements. Under this system, a 4-6-0 as well as a 2-6-2 could be represented by the fraction $\frac{3}{5}$. The following table gives the wheel arrangement, the name and the three notations.

Most of the names given in this table are not only of American origin, but the greatest use of these names had been made by railway officials in the U. S. A. The names "Planet" and "Jenny Lind" are typically English, however. The research into the origin of the names has proved to be extremely fascinating, and it is hoped that the following notes, which include the data on which some of the classes first saw the light of day, will prove to be of interest to every railway enthusiast. 4-2-0's and 2-4-0's have no name, and, though their history may be interesting, it is not included in this article. Neither is every name dealt with in detail.

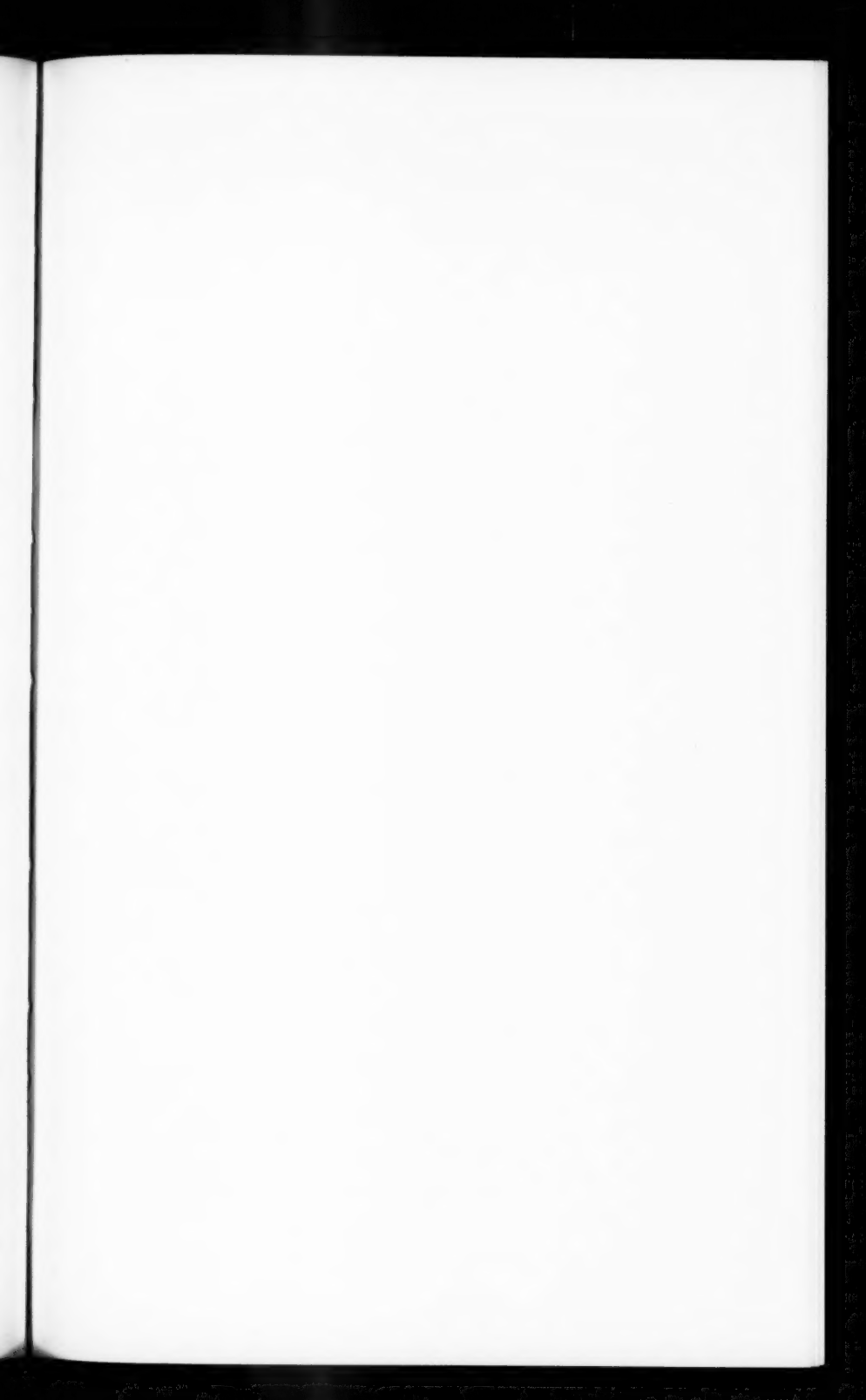
The "Planet" was built by George Stephenson for the Liverpool and Manchester Railway, in 1830, the cylinders being placed inside the smokebox. In November of the same year, "Planet" hauled a special train between Manchester and Liverpool, the journey of 31½ miles being completed in one hour. This design became the standard, and large numbers were built for passenger work. The

Table 1

Wheel Arrangement	Whyte's Notation	French	New German	Name
Front				
o O	2-2-0	1-1-0	1A	Planet
o O o	2-2-2	1-1-1	1A1	Jenny Lind
o o O o	4-2-2	2-1-1	2A1	Bicycle
o O	0-4-0	0-2-0	B	Four wheel switch
o O o	0-4-2	0-2-1	B1	-----
o o O O	4-4-0	2-2-0	2B	American
o O O o	2-4-2	1-2-1	1B1	Columbia
o o O O o	4-4-2	2-2-1	2B1	Atlantic
o O O o o	0-4-4	0-2-2	B2	Forney four-coupled
o O O o o o	0-4-6	0-2-3	B3	Forney four-coupled
o o O O o o	4-4-4	2-2-2	2B2	Reading or Jubilee
o O O	0-6-0	0-3-0	C	Six wheel switch or Bourbonnais
o O O O o	0-6-2	0-3-1	C1	-----
o O O O	2-6-0	1-3-0	1C	Mogul
o o O O O	4-6-0	2-3-0	2C	Ten wheel
o O O O o	2-6-2	1-3-1	1C1	Prairie
o o O O O o	4-6-2	2-3-1	2C1	Pacific
o O O O o o	0-6-4	0-3-2	C2	Forney six-coupled
o O O O o o o	0-6-6	0-3-3	C3	Forney six-coupled
o O O O o o o	2-6-4	1-3-2	1C2	Adriatic
o o O O O o o	4-6-4	2-3-2	2C2	Baltic or Hudson
o O O O O	0-8-0	0-4-0	D	Eight wheel switch
o O O O O	2-8-0	1-4-0	1D	Consolidation
o o O O O O	4-8-0	2-4-0	2D	Twelve wheel (formerly called Mastodon)
o O O O O o	2-8-2	1-4-1	1D1	Mikado
o o O O O O	4-8-2	2-4-1	2D1	Mountain or Mohawk
o O O O O o o	2-8-4	1-4-2	1D2	Berkshire
o o O O O O o o	4-8-4	2-4-2	2D2	Confederation, Northern Pocono, Niagara
o O O O O O	0-10-0	0-5-0	E	Ten wheel switch
o O O O O O	2-10-0	1-5-0	1E	Decapod
o o O O O O O	4-10-0	2-5-0	2E	Mastodon
o O O O O O o	0-10-2	0-5-1	E1	Union switch
o o O O O O o o	2-10-2	1-5-1	1E1	Santa Fe
o o O O O O o o	4-10-2	2-5-1	2E1	Southern Pacific
o O O O O O o o	2-10-4	1-5-2	1E2	Texas
o O O O O O O	2-12-0	1-6-0	1F	Centipede
o O O O O O o o	2-12-2	1-6-1	1F1	Javanic
o o O O O O O O	4-12-2	2-6-1	2F1	Union Pacific
o o O O O O O O O	4-14-4	2-7-2	2G2	Soviet

engines weighed only eight tons, but even this weight was too heavy for the rails used at that time. Because they had only four wheels, and also because the firebox overhung the driving wheels, the engines were unsteady.

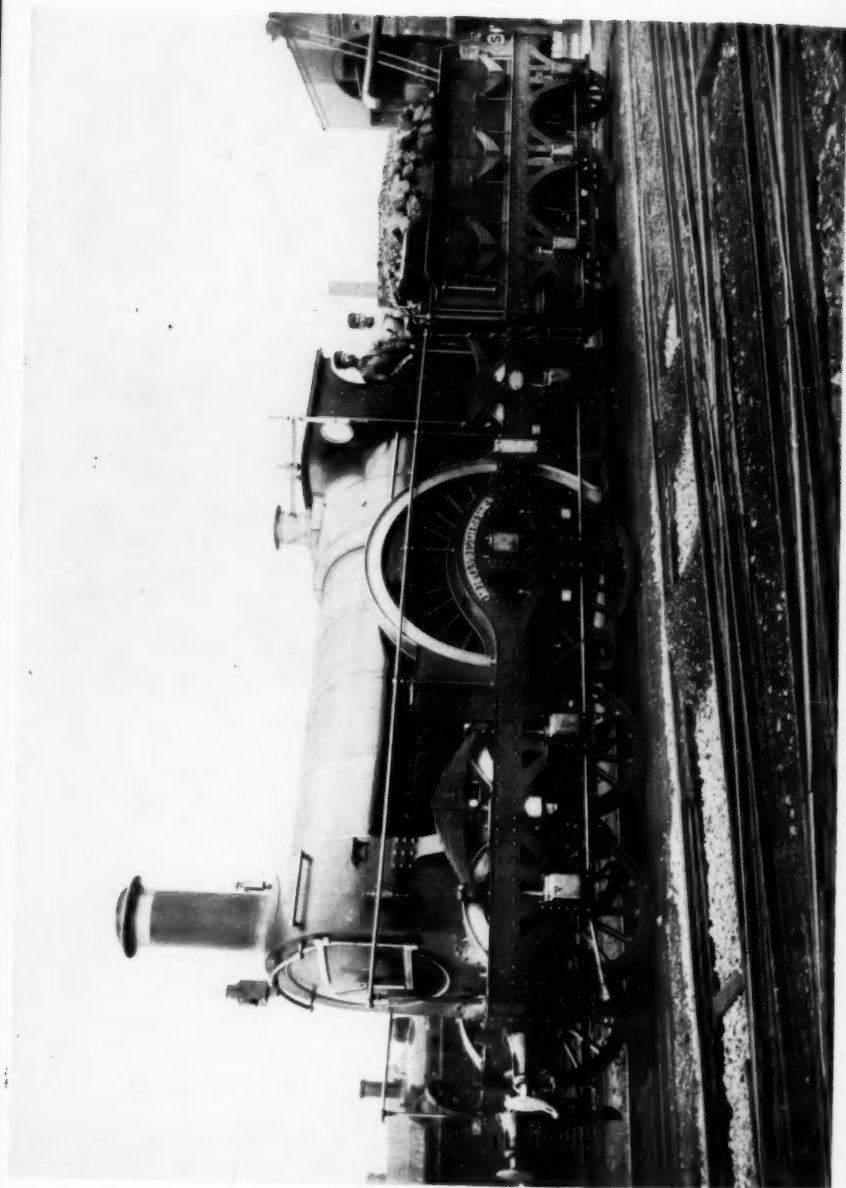
As a result, George Stephenson, in November, 1832, recommended the use of six-wheel engines to the directors of the Liverpool and Manchester Railway. Two trailing wheels were therefore added to give the 2-2-2 wheel arrangement. This design, embodying





An 0-6-0 "Goods" engine for the North Eastern Railway. Built by the N. E. Ry., at Gateshead Works.

Courtesy of F. Stewart Graham



An 8-foot "single" for 7-foot gauge. "Prometheus" of the Great Western Ry. Built at Swindon Works in 1858.

Courtesy of F. Stewart Graham

several improvements, was patented by Stephenson in 1833, and was known as the Patentee class. The 2-2-2's were used extensively in British railways. The last 2-2-2 was in use in this country many years after the commencement of the present century.

It is of interest to know that engines similar to the "Planet" were fitted with four-coupled wheels for hauling freight trains.

In 1847, David Joy designed for the Midland Railway an engine of the 2-2-2 wheel arrangement, which had 120 lbs. steam pressure, and was built by E. S. Wilson, of Leeds. The locomotive proved to be extremely successful, one of the class, in 1848, taking an express train from Derby to Altofts, a distance of 64 miles, in 68 minutes. In 1847, the famous singer, Jenny Lind, visited this country, went to the States in 1850, and finally made her home in England. It was most appropriate that these fine-running engines should be named after one who has been called the sweetest singer of her day. The 2-2-2's were generally used for express passenger work, attaining high speeds with moderate loads. Although the type was quite plentiful in this country, very few were built in the United States. In the annual report of the Cumberland Valley R. R., for the year 1853, mention is made of the 2-2-2 locomotive carrying the name "Jenny Lind." It was built in 1851 by Seth Wilmarth, of Boston, Mass., and weighed 10 tons. Perhaps not more than a dozen of this wheel arrangement were built in the States.

The 4-2-2's were a development of the 2-2-2's, having a leading bogie, instead of a leading axle. They were nicknamed "Bicycle," since a bicycle has only two wheels and this type had two driving wheels. In 1846, the Great Western Railway built a single-driver engine named "Great Western," which had the 2-2-2 arrangement, and was one of the most powerful locomotives built up to that time. It was designed by Daniel Gooch and had driving wheels 8 feet in diameter. On one occasion it travelled between Paddington and Swindon, 77 miles, in 78 minutes, with a load of 100 tons, which was extremely heavy for those days. A few days later, it travelled the 193½ miles between London and Exeter, via Bristol, in 208 minutes. Shortly afterwards the leading axle broke, and the locomotive was fitted with an additional pair of leading wheels, changing it to a 4-2-2. This was the origin of the "Iron Duke" class. These G. W. R. engines were not bogie engines, since all of the axles ran in the main frame.

A famous 4-2-2 was the 5000th locomotive designed and built by Baldwin, in 1880, for the Philadelphia & Reading R. R., and later brought to England. This type, of course, had been used in the United States prior to this time.

The switching types are the 0-4-0, 0-6-0, 0-8-0 and 0-10-0, deriving their names from the number of drivers, such as "four wheel" switcher, "six wheel" switcher, and so on. The English translation of switching is "shunting." The 0-4-0 was designed principally for work at docks, in sidings and in plants. George Stephenson's first locomotives, which were four-coupled, were con-

structed for colliery lines. Hedley coupled locomotives for colliery working before Stephenson. Chains were used first, then cranked axles, and finally outside rods. Robert Stephenson & Company built "Locomotion," an 0-4-0, which was the first engine to be built for the opening of the Stockton & Darlington Railway, in 1825.

It is generally accepted that the locomotive named "America," built by Robert Stephenson & Company, arrived in New York on January 15th, 1829, and that the three locomotives, "Stourbridge Lion," "Delaware," and "Hudson," built by Foster Rastrick & Company, England, which arrived in New York later in 1829, all had the 0-4-0 wheel arrangement. The "Stourbridge Lion" made its trial trip on August 8th, 1829, and this was the first operation of a locomotive in America. Many years ago, a member of the Railway and Locomotive Historical Society, Inc., of Boston, Mass., did some research on the papers of John B. Jervis, Chief Engineer of the Delaware & Hudson Canal Company at the time the locomotives were introduced into America. These papers are preserved in the John B. Jervis Library, at Rome, N. Y. It is concluded that the name "America" was placed on the locomotive drawing to show its destination, the Jervis papers stating positively that the name of the engine was "Pride of New Castle."

With regard to the other locomotives from Foster Rastrick, the name "Stourbridge Lion" is correct. There is every reason to believe that one of the other Rastrick engines was named "Round-out," after the landing place on the Hudson River. The name of the third engine is not known.

Nearly twenty-five years elapsed after the opening of the Stockton and Darlington Railway, in 1825, before four-coupled locomotives materialized in England. The 4-4-0, commonly called the "American" type, originated in the U. S. A. In 1836, a number of Railway Engineers in America started to build 4-4-0's. The pioneer, Henry R. Campbell, chief engineer of the Philadelphia, Germantown and Norristown Railroad, patented his design of 4-4-0's on February 3rd, 1836. The first engine of this wheel arrangement was built by James Brookes, of Philadelphia, in March, 1836, under the Campbell patents. 4-4-0's were used in the States for many years for passenger and freight services. The earliest record of British 4-4-0's is of two broad-gauge, saddle-tanks built for the Great Western Railway in 1849. The period 1854-1860 is noteworthy in that the 4-4-0 was introduced for express passenger work, a greater use was made of the bogie, and coal superseded coke as the fuel for locomotives. The early British 4-4-0's had outside cylinders like their American counterparts. The Great Western Railway was the first British Railway to introduce 4-4-0's for express passenger work. In 1855, the Stephenson factory built ten engines of the "Coeur de Lion" class, with 7' driving wheels, for hauling fast trains between Swindon and South Wales.

The typical British 4-4-0 was brought out in 1871, by Thomas Wheatley of the North British Railway, with inside cylinders, in-

side frames, and bogies. It was then that the 4-4-0 began to come into its own for express working. The Great Western Railway was the only main line railway which did not build 4-4-0's with inside frames and inside cylinders, but built equivalent locomotives with double frames.

Columbia is the poetical name for America (f. Columbus). The 400th anniversary of the discovery of America was commemorated by the World's Columbian Exposition, held in Chicago in 1892-3, and Baldwin's built the first American 2-4-2, or Columbia type, in time for this Exposition. Tender engines of the 2-4-2 type enjoyed great popularity on the Continent, viz., on the P. L. & M. Railway, when their express type of 1870 had this wheel arrangement. The 2-4-2 tender engines were never popular in Great Britain (or United States), only the tank variety of this wheel arrangement being used.

The 2-4-2 "tank" engine made its appearance in 1863 or 1864, on the St. Helen's Railway, which was absorbed shortly afterwards by the London & Northwestern Railway. It had radial axle boxes at each end, these having been patented by W. R. Adams, in 1863. Sinclair introduced this wheel arrangement on the Great Eastern Railway in 1864, the design being based upon his 2-4-0 freight engines, and a 2-4-2 tender engine (the first engine of the 2-4-2 type) he had designed for the Grand Luxemburg Railway in Belgium, and which was built by R. Stephenson & Company, in 1860.

Large numbers of 2-4-2 tank engines were built in this country for the various railway companies.

The 4-4-2 or "Atlantic" type was a natural development of the 4-4-0, to give a larger boiler. The "true" Atlantic has a wide firebox and outside cylinders. The 4-4-2 with a narrow firebox, e. g., those built by Aspinall for the Lancashire & Yorkshire Ry., and by Raven for the North Eastern are not, strictly speaking, "Atlantics," but only 4-4-2's. Nevertheless, they are always referred to as "Atlantics." The first locomotive of this type was an experimental one, named "A. G. Darwin," and was built by the Hinkley Locomotive Works, of Boston, Mass., in 1888, and was tried on several railroads. The first Atlantic built for a railroad was designed by W. P. Hussey, in 1895, (built by the Baldwin Locomotive Works) and first used on the 70 MPH express train of the Atlantic Coast Line, in 1896.

In 1898, H. A. Ivatt, Chief Mechanical Engineer of the Great Northern Railway, introduced the first Atlantic in this country, named "Henry Oakley." At that particular time, men were rushing to the Klondike, so the Great Northern Atlantics were nicknamed "Klondikes." Four years later, Ivatt introduced a much larger type, taking advantage of this wheel arrangement to have the firebox built right across the frames to the full width of the engine.

There are now very few tender Atlantics left. Their smaller brethren, the 4-4-2 tank engines, were built many years before them, the first of which were built for the London, Tilbury & South-

end Railway, between 1880 and 1892, by Sharp, Stewart & Company, and by Nasmyth Wilson & Company.

Forney four-coupled engines were named after the American designer, and were used extensively in the United States. They had outside cylinders, and tanks at the back, over the bogie. The Forney type never became popular in Great Britain, because of the objection to outside cylinders. Four engines were built by Nelson & Company, in 1873-4, for the Caledonian Railway, and, with the exception of one Fairlee engine, were the only examples of the Forney type on the standard gauge roads. The forney four-coupled locomotives were used on the New York elevated railways.

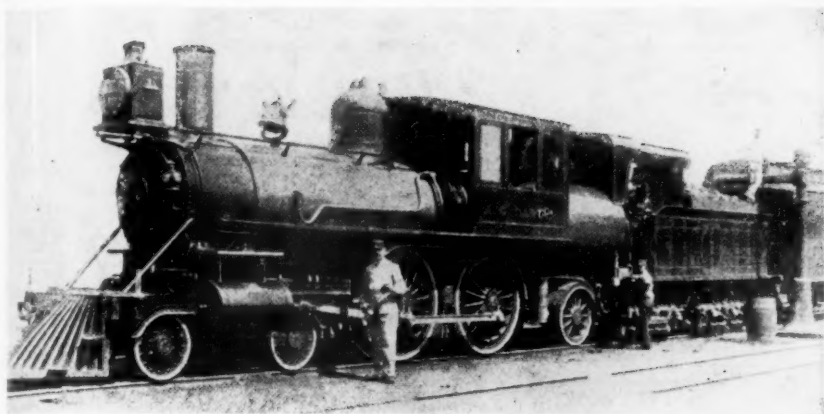
The first 0-4-4 tanks in Great Britain, with front-coupled wheels and trailing bogies, were built in 1866 by Brassey & Company, of the Canada Works, Birkenhead, for the South Eastern Railway, to the designs of J. J. Cudworth. Famous English 0-4-4 tanks were those designed by Mr. Kirkley and built for the Midland Railway, in 1869-70; S. W. Johnson's for the Great Eastern Railway, in 1873; and D. Drummond's for the Caledonian, in 1879-80.

The "Reading" or 4-4-4 type was first used on the Philadelphia & Reading Railway, which designed and built four of these locomotives, in 1915. They were not successful and, in 1916, were rebuilt to Atlantics. Tender engines of the 4-4-4 type were never used in Great Britain, and 4-4-4 tank engines were used only to a slight extent on suburban passenger trains. The first of these engines were built in 1896, for the Wirral Railway. Others were built by Raven, in 1913, for the North Eastern Railway, but were converted to 4-6-2 tanks by the London & North Eastern, in 1930.

It was in 1886 that the first train on the Canadian Pacific travelled between Montreal and Vancouver (then known as Port Moody), six days being taken for the journey of nearly three thousand miles. Fifty years later, in 1936, the Canadian Pacific introduced the first five of fifteen engines of the 4-4-4 wheel arrangement, these being called the "Jubilee" type, in honor of the Silver Jubilee, commemorating the 25th anniversary of the accession to the throne of King George V. The balance of ten locomotives of this successful class were built in 1937-38.

The first 0-6-0 was the "Royal George," built in 1827 by T. Hackworth, for the Stockton & Darlington Railway. Stephenson's "Experiment," built in 1827 with four wheels, was rebuilt in 1828 as a six-wheel, coupled engine, for the same road. Hackworth's engine had vertical cylinders, but Stephenson's rebuild had horizontal cylinders. The prototype of the British six-coupled freight locomotive was built in 1834, for the Leicester & Swannington Railway, by R. Stephenson & Company. The name "Bourbonnais" was originally given to a class of 0-6-0 tank engines, built about 1857 for the Bourbonnais district of France.

The 2-6-0 is a natural development of the 0-6-0, permitting a larger boiler and, if necessary, larger cylinders. From about 1901 to 1935, it was the most popular mixed-traffic or general purpose



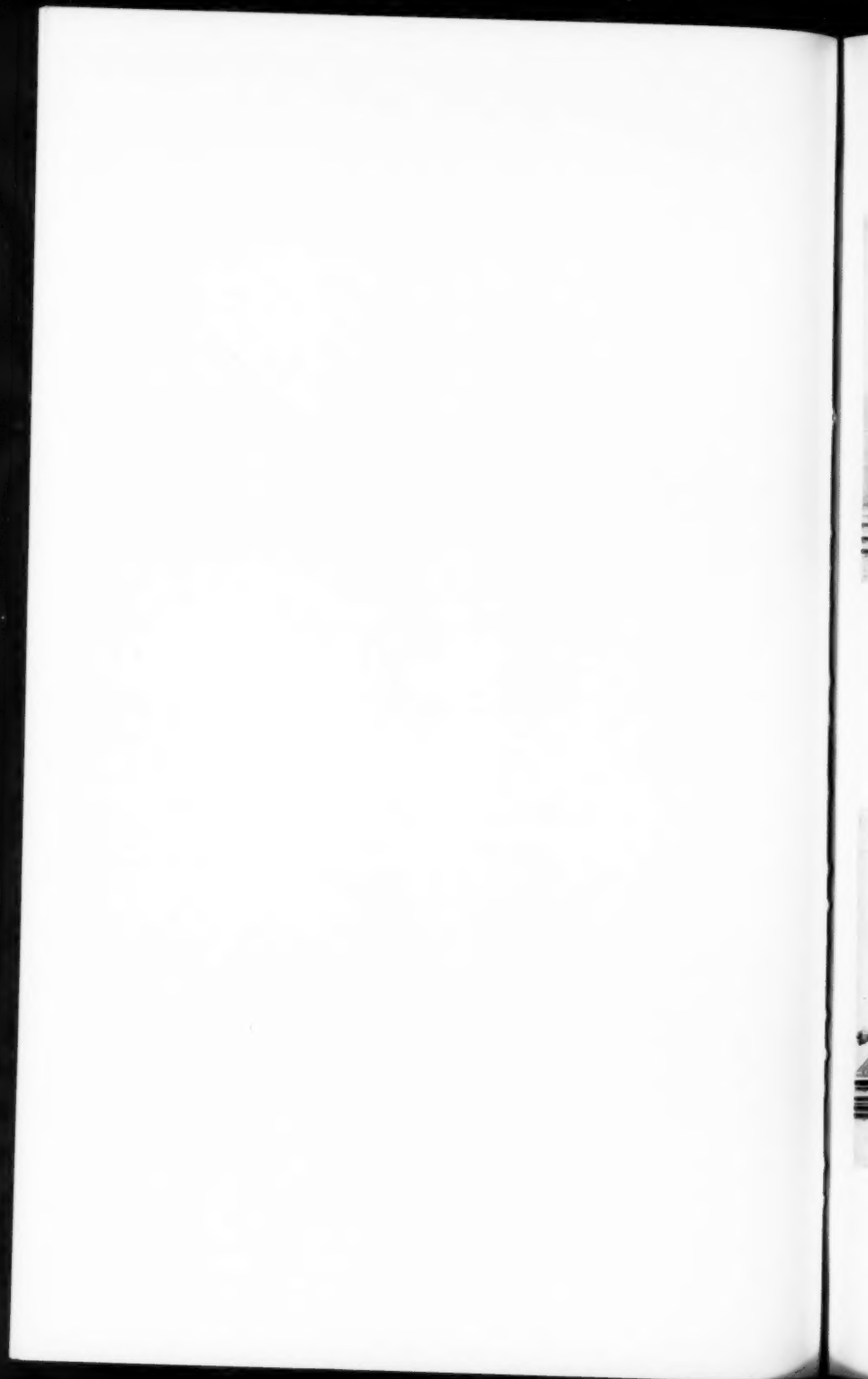
Courtesy of F. Stewart Graham.

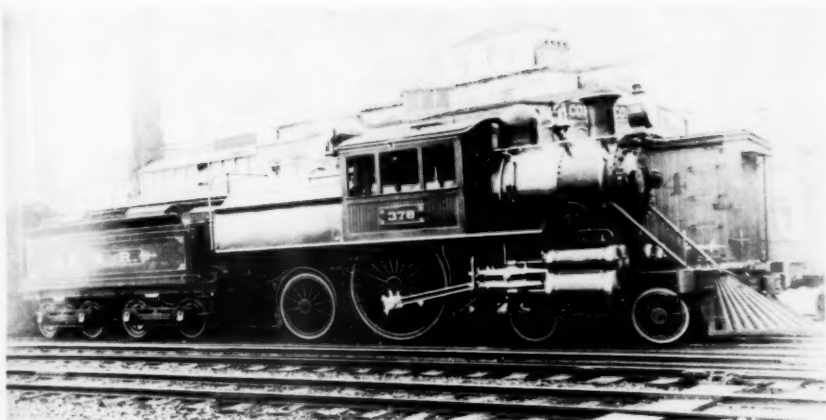
The "A. G. Darwin" in passenger service in Ohio. Original radial valve gear has been replaced with Stephenson link motion.



Courtesy of C. E. Fisher

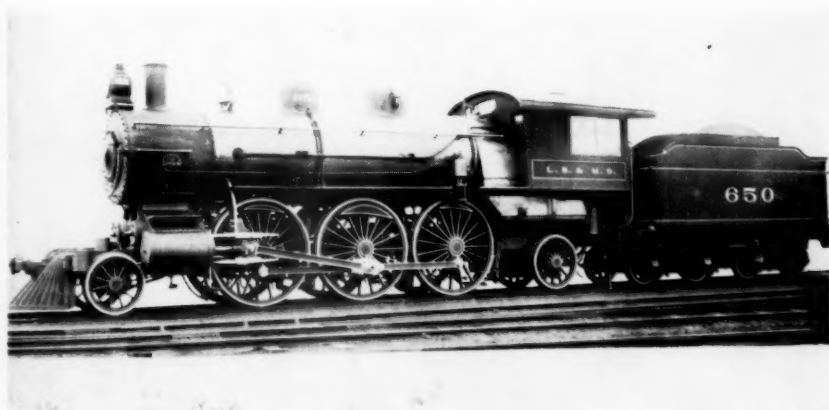
P. & R. #694, 2-4-2 type, Baldwin 1893.





Courtesy of C. E. Fisher

P. & R. #378, 4-2-2 type, Baldwin 1896.



Courtesy of C. E. Fisher

L. S. & M. S. #650, 2-6-2 type, Brooks 1900.

1871

1872

D.



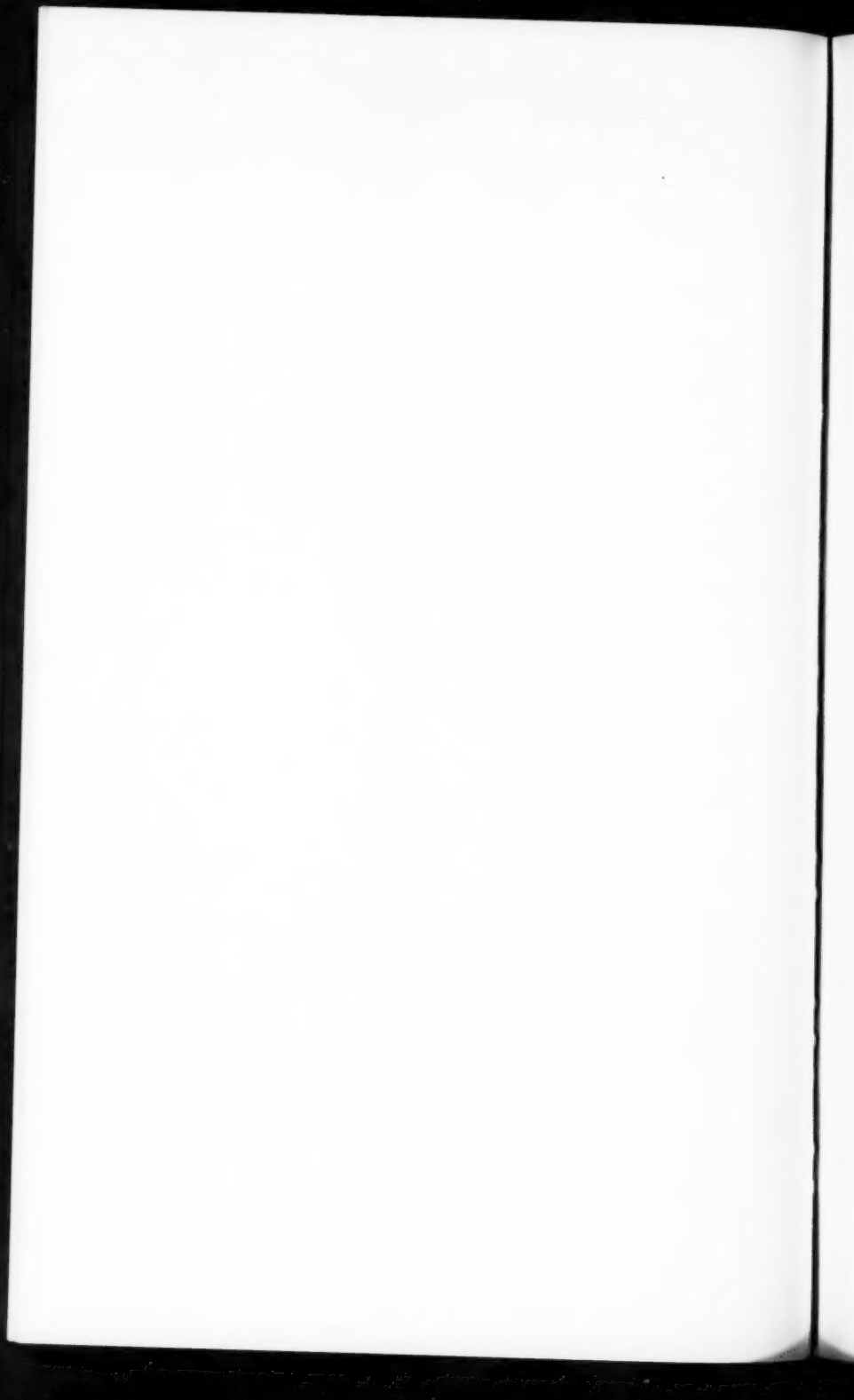
Courtesy of F. Stewart Graham

D. L. & W. 2204. Schenectady No. 66957. 1926. Three-cylinder development of the "Mountain" or 4-8-2 type.



Courtesy of F. Stewart Graham

D. L. & W. 1503. Schenectady No. 67528. 1927. An excellent example of the "Pocono" or 4-8-4 type.



tender locomotive in this country. Each of the four railway groups built 2-6-0's or "Moguls." The majority of engines of this type had 5' 8" driving wheels, but the small wheel diameter has not prevented them from attaining speeds of 80 miles per hour.

"Mogul" is the Arabic and Persian form of the word Mongol, applied to the Mohammedan Empire in India. The first 2-6-0 in America was built by the Rogers L. & M. Co., in 1863, for the New Jersey Railroad & Transportation Co. It was probably the largest locomotive built up to that time, and, by analogy with the size of the Mohammedan Empire, the 2-6-0's received the name "Mogul." (Editor's note. Both the Pawnee class on the Philadelphia & Reading, and the Anthracite class on the D. L. & W., antedating the Rogers engine by almost twenty years, used the 2-6-0 wheel arrangement, but were not considered true Moguls, as the pony truck in each of these classes was placed back of the cylinders, instead of ahead of them, the journal boxes being set in the main frames.)

The first 2-6-0 in Great Britain was built for the Great Eastern, in 1878. The first 2-6-0 tank engine was one reconstructed, in 1899, by F. Willans, at the Wrexham Works of the Wrexham, Mold & Connah's Quay Railroad. The next 2-6-0 tank engine on a British Railway was a side-tank engine built in 1909, by Manning, Wardle & Co., Ltd., for the Knott End Railway. In 1887, F. W. Webb, of the London & North Western, designed a 2-6-0 tank engine in which the leading pair of wheels were subsequently left uncoupled, thus giving a 2-2-4-0 arrangement.

Moguls were nicknamed "Crabs" in the L. M. S. system, and the type named Mogul was unknown to many drivers, who insisted that the correct designation was "Crab."

The Prairie States lie west of the Mississippi River, and east of the Rocky Mountains. The Prairie type, or 2-6-2, was first used on the mid-western railroads, which crossed the Prairie States, the first 2-6-2's being built by the Brooks Locomotive Works, in 1900, to the design of H. F. Ball, of the Lake Shore & Michigan Southern. (Editor's note. The 2-6-2 wheel arrangement was applied to engine #15 (222), named "Luzerne," built by the D. L. & W. Railroad, at the Kingston, Pa. Shops, in 1878.)

Although the Prairie type originated on the L. S. & M. S., they were used in far greater numbers on the C. B. & Q., Northern Pacific, Great Northern, and A. T. & S. F. The true Prairies were built with wide fireboxes, and were specifically designed for handling trains over the level prairie, where the train load was limited only by the steaming capacity of the boiler. The *true* Prairie type locomotive originated on the C. B. & Q., the design being prepared in 1899, and four locomotives designated as the R-1 class were built in the Burlington Shops, in 1900, under the direction of Mr. F. A. Delano, Superintendent of Motive Power. The Santa Fe received its first 2-6-2 in 1901, from the Baldwin Locomotive Works.

The first 2-6-2 tender engine in Great Britain was an experi-

mental one designed by C. Paget for the Midland Railway, in 1908. Unfortunately, it never got beyond the experimental stage. The only 2-6-2 tender engines used in this country were designed by H. N. Gresley, Chief Mechanical Engineer of the London & North Eastern, and built by that company. They are mixed-traffic locomotives, and are the "Green Arrow" class.

The first 2-6-2 tank engines used in this country were those designed and built for the Mersey Railway, in 1887, by Beyer, Peacock & Co. H. A. Hoy built 2-6-2T's for the Lancashire & Yorkshire Ry. in 1903, but these were never successful. The 2-6-2T type was used extensively on the Great Western, where it was introduced in 1905.

The 4-6-0, having ten wheels in all, was simply named "Ten Wheeler." The first of this type was built in the United States, in 1847, by Norris Brothers, of Philadelphia, for the Philadelphia & Reading, and was named "Chesapeake." These 4-6-0's were built for dealing with heavy traffic in colliery areas. The first 4-6-0 tender engine in Europe was built for an Italian Railway, in 1884.

The first 4-6-0's in Great Britain were freight locomotives designed by David Jones and built in 1894, for the Highland Railway, of which Jones was Chief Mechanical Engineer. Unfortunately, Jones met with an accident while studying the performance of his freight engines, and was forced to retire in 1896. There is little doubt that, if it had not been for this accident, Jones would have been the first to introduce the 4-6-0 passenger engine in Great Britain. As it was, the first ten British 4-6-0 express passenger engines were built in 1899-1900, by the North Eastern Ry., to the design of W. Worsdell, Chief Mechanical Engineer.

David Jones's design for express passenger 4-6-0's, with slight modifications, was introduced on the Highland Railway by P. Drummond, in 1900, as the "Castle" class.

Ten-wheel tank engines were built in 1907, for the Whitby District of the North Eastern, but they were eventually converted to 4-6-2 tank engines. Sharp, Stewart & Company built some 4-6-0 tank engines for the steeply graded sections of the Great Indian Peninsular Railway, about 1860.

The 4-6-2, or "Pacific" type, may be considered a development of the 4-6-0's, to give more support at the rear end, and allow a larger boiler and wider firebox to be used. It may also be considered a development of the Atlantic type, having three pairs of driving wheels instead of two, and consequently a larger boiler and firebox, with the attendant increase in steam capacity and tractive effort. The first Pacific was designed in 1886, by G. S. Strong, and was built at the Wilkes-Barre, Pa., shops of the Lehigh Valley R. R., and used for a time on that road. Baldwin's were the next to build the Pacific type, in 1901, for the New Zealand Railways. In 1903, the American Locomotive Company built some for the Missouri Pacific R. R., hence the name "Pacific."

(Editor's note. In 1893, the Rhode Island Locomotive Works built two locomotives for the Chicago, Milwaukee & St. Paul, placing a trailing truck behind the driving wheels of ten-wheelers. This trailing truck was subsequently removed, and these engines, in spite of being 4-6-2's, are not credited with being the first Pacifics).

In Great Britain, the first Pacific was built by the Great Western Railway in 1908, but was never a success, its long wheel base proving unsuitable for the winding main line leading from Reading into Devon and Cornwall. It was used only between Paddington and Bristol. This was the one and only Pacific built by the Great Western. No more Pacifics were built in this country until 1922, when H. N. Gresley introduced the first of his "A-1" Pacifics on the Great Northern Ry. At about the same time, Sir Vincent Raven built some 4-6-2's for the North Eastern.

As a result of nationalisation, the Western Region of British Railways (formerly the Great Western) are allocated ten of the standard Class 7 Pacifics, built in 1951.

The first 4-6-2 superheated tank engines were built by J. Earl Marsh, for the London, Brighton & South Coast, in 1910, being closely followed by the North Eastern Railway 4-6-2T's, built in the same year.

Tender engines of the 2-6-4 type have never been built for any British railway. They were given the name "Adriatic" because they were used in Austria. Large numbers of 2-6-4 tank engines have been built for use in this country, principally on the London, Midland & Scottish Railway. The first were built by the Great Central Railway, in 1914, to the designs of J. G. Robinson, Chief Mechanical-Engineer. These were freight engines. The first 2-6-4 tank engines for passenger service were built by the South Eastern & Chatham Ry., in 1917, to the designs of R. E. L. Mannsell.

The first 4-6-4 locomotives were experimental ones built by the Northern Railway of France, in 1910. They were given the name "Baltic" because, at the same time, the Vulcan Works of Stettin were building some 4-6-4 tank locomotives for the Prussian State Railways.

The first 4-6-4's in the States were built for the New York Central and Hudson River Railroad, and named after the River Hudson. They were introduced in 1927, and the New York Central Railroad developed the use of this type to the fullest extent. P. W. Kiefer, of the New York Central Railroad, and the American Locomotive Company were responsible for the design.

The one and only 4-6-4 in Great Britain was built in 1929, by the London and North Eastern Railway, to the design of H. N. Gresley. It was originally built as a compound. Because the firebox was carried on two fixed axles, and not on a bogie, the correct wheel arrangement is 4-6-2-2. In 1937 this high-pressure locomotive, No. 10,000, was rebuilt as a "Simple," with the same kind of streamlined casing as Gresley's A4 Pacifics.

The first 4-6-4 tank engines were built for the London, Tilbury and Southend section in 1912, to the design of R. H. Whitelegg. He also introduced this wheel arrangement on the Glasgow and South Western Railway in 1918. The most powerful British 4-6-4 tank engines were built in 1914, for the London, Brighton and South Coast Railway, chiefly for use on the Victoria to Brighton 60-minute working, the majority of these being really express engines without tenders. When this line was electrified in 1933, they were deprived of suitable work on the Central Section of the Southern Railway. They were rebuilt as tender locomotives of the 4-6-0 type and transferred to the Western Section of the Southern Railway. The London, Midland and Scottish Railway had about twenty Baltic tanks at one time, and 4-6-4's have only been used in this country as passenger tank engines. It has been claimed that the symmetrical wheel arrangement has provided plenty of adhesion weight, with complete flexibility of the wheel base.

The 0-8-0's are called "Eight-wheel" or "Eight-wheel Switcher." One of the earliest 8-coupled engines built in Great Britain, and the first to be built by the North British Locomotive Company, was completed in 1865, for one of the Indian Railways. Four engines of this type were built and supplied to the Barry Railway in 1886 or 1889, and were the first 8-coupled tender engines to be used by a British Railway. The 0-8-0 tank engines are used in this country for shunting and marshalling of freight trains, the first 0-8-0 tank engines being used on the Vale of Neath Railway, in 1864.

The 2-8-0 is a development of the 0-8-0, the two leading wheels improving the behaviour of the locomotives on curves, and providing extra support for the weight at the front end.

The first locomotive of the 2-8-0 wheel arrangement was built in 1866, by M. W. Baldwin and Company, for the Lehigh Valley Railroad, and was named "Consolidation," which name was later given to this class. Two explanations have been given for the name "Consolidation." At that time, viz., 1866, the Lehigh Valley Railroad was in the process of consolidating several small railroads into one large railroad, one being the Lehigh and Mahanoy Railroad. On the other hand, 2-8-0's represent a consolidation or joining together of the two pairs of driving wheels of two 4-4-0 locomotives. (The former explanation is generally accepted in America. Ed.)

The first 2-8-0's were introduced in Great Britain in 1903, by the Great Western Railway. They were mixed traffic locomotives. Consolidations designed by J. G. Robinson for the Great Central Railway, in 1911, were the standard locomotives of the War Department in World War I. 2-8-0 tank engines have been used extensively for short distance mineral trains. The Great Western Railway 2-8-0 tank engines have been rebuilt as 2-8-2's, to increase the bunker capacity.

In life, the Mastodon closely resembled an elephant, having similar tusks and a trunk, but was lower and longer in relative proportions. Remains of the common American Mastodon have

been found in great abundance. The 4-8-0's were formerly called Mastodon, since someone evidently saw some connection between their size and that of the Mastodon. This name has now been given to the 4-10-0's, a type not used in Great Britain. The 4-8-0's are now called 12-wheelers.

The Brooks Works, in the U. S. A., were one of the first to use the 4-8-0 wheel arrangement, and the first engines of this type were completed in 1891, for the Great Northern Railway (U. S. A.). The 4-8-0 tender engines were never used in Great Britain. Tank engines of this wheel arrangement are used in marshalling yards. Four large 4-8-0 tank engines were built by R. Urie, of the London and South Western Railway, in 1921, for use in the marshalling yard at Feltham. The first 4-8-0T's were built for the North Eastern Railway, in 1909, to W. Worsdell's design.

The "Mikado" type, or 2-8-2's, were first built for the Japanese Government Railways. One of the earliest 2-8-2's in the States was designed and built in 1902, by the Baldwin Locomotive Company, for the Bismark, Washburn and Great Falls Railroad, and was a compound.

In 1925, the London and North Eastern Railway built two 2-8-2 mineral locomotives. They proved too powerful for the work to be done. Later, in 1934, six 2-8-2 passenger locomotives were built by the London and North Eastern Railway. They were intended for the difficult section of the East Coast route between Edinburgh and Aberdeen. They were rebuilt as 4-6-2's by Thompson, Gresly's successor.

2-8-2 tank engines have been built for suburban passenger trains. Many years ago, the Great Western Railway rebuilt some of their 2-8-0 tank engines as 2-8-2T's, thereby increasing the bunker capacity by 50%, and providing economical haulage of coal trains up and down the short but steeply graded valleys of the South Wales coalfield.

4-8-2's (Mountain or Mohawk type). These were first used in the mountainous country traversed by the Chesapeake and Ohio Railway. The first of this type was built in 1911, at the Richmond works of the American Locomotive Company for the above railroad, the design being the combined effort of the builders and the railway.

No 4-8-2's have been used in Great Britain, but they are used freely on the P. L. M., State, and Eastern Railways of France.

The 2-8-4's (Berkshire) were first used on the Boston and Albany Railroad, which traverses the Berkshire Hills in the U. S. A. The first of this type was built in 1924, to the design of W. E. Woodward, of the Lima Locomotive Works. This type has also been used for express service in Austria, but has never been used in this country.

4-8-4's were first used on the Great Northern Railway (U. S. A.), hence the name "Northern." They were designed by Baldwins and the Railway, and the first one was built in 1929, by Baldwins. It might be mentioned here that in Great Britain loco-

motives are built by the Railway Company to the designs of its Chief Mechanical Engineer, although in some cases outside firms get the contract. In the U. S. A., however, the Mechanical Department of the Railroad generally specifies what is required and works jointly with the builders in designing the locomotives. (Currently, the Norfolk & Western Railway is the only major railroad in the United States to build its own locomotives, and, during the past twenty-five years, locomotive building by the railroads themselves has been limited to very few roads, notably the Pennsylvania and the Reading Company railroads. Ed.)

Tender engines of the 4-8-4 type have never been used in Great Britain, but 4-8-4 tank engines have been used for suburban passenger traffic.

The term "Confederation" has been applied to this type by the Canadian National Railways, because the Dominion of Canada is a confederation of the provinces. It is the only railway on which this name applies.

The Delaware, Lackawanna & Western R. R. used 4-8-4's for hauling heavy trains over the Pocono Mountains, in northeastern Pennsylvania, and called their 4-8-4's the "Pocono" type. Pocono, meaning Broad Mountain, is of American Indian origin and suitably describes these plateau-type mountains.

In Great Britain, locomotives of the 0-10-0 wheel arrangement were originally termed "Decapods." The first 0-10-0 tank engine in Great Britain was built by the Great Eastern Railway, in 1902. The first 0-10-0 tender engine was built by the Midland Railway, making its appearance on January 1st, 1920. It was designed for banking duties up the Lickey Incline. The American name is "Ten-wheel Switcher."

The name "Decapod" is now given to the 2-10-0's, which are similar to the Consolidations, the additional pair of driving wheels permitting the use of a larger boiler, and providing greater adhesion and tractive force. The first 2-10-0 was built in 1867, by Norris Brothers, at Lancaster, Pa., for the Lehigh Valley R. R., and was used for heavy freight working. The name "Decapod" (having ten feet) was applied to subsequent locomotives of this class, the original ones being named the "Ant" and the "Bee."

It was not until 1944 that 2-10-0's made their appearance in Great Britain for handling freight traffic.

The 2-10-2 type was first used on the A. T. & S. F. Ry., and was aptly named "Santa Fe" type. The first of these locomotives was No. 915, and was built in 1903. Its design was a joint effort of the Baldwin Locomotive Works and the Santa Fe motive power department, following experience with three Decapods (2-10-0), which gave difficulty in backing around sharp curves.

The Texas & Pacific R. R., using the 2-10-4 wheel arrangement for the first time, in 1925, adopted the name "Texas" for this type.

What is probably the largest locomotive of the non-articulated type has the 4-14-4 wheel arrangement and, introduced in Russia in 1935, was given the name "Soviet."

In conclusion, it is a pleasure to acknowledge the help given me by a fellow railway enthusiast in the United States, by Mr. Lehr, of the Lehigh Valley R. R., and by Mr. Reinhold, of the Atchison, Topeka & Santa Fe. I am also grateful for the helpful criticism of two friends, and for information supplied by the Publicity Department of French Railways, Ltd.

Editor's note. Since Mr. Gaskell's article essays to "cover" all of the wheel arrangements of non-articulated locomotives, mention should also be made of several types developed and, except for the 4-4-4-4 type, used only on the Pennsylvania R. R. Their classes Q-1 and Q-2, with 4-6-4-4 and 4-4-6-4 wheel arrangements, respectively, were developed for high-speed, heavy freight service, while the fifty or more Class T-1 engines, of the 4-4-4-4 type, were built for passenger service, and were that road's final contribution to steam motive power. This wheel arrangement was also used by the Baltimore & Ohio on one experimental locomotive. Pennsylvania R. R. classes S-1, type 6-4-4-6, and S-2, a turbine-driven locomotive of the 6-8-6 type, were both of the experimental class, and but one of each kind was built.

No specific names were ever assigned to these wheel arrangements, but, to add to the confusion in names for the various types, there was a definite tendency among American railroads to apply local names to suit themselves, rather than to establish a standard name for given types. For example, in the early years of the 4-4-2, it was referred to both as "Atlantic" and "Chataqua," the 2-6-2 was called both "Prairie" and "Lake Shore," and, in later years, the 4-8-2 was called "Mountain" type, generally, and "Mohawk," on the New York Central, and the 4-8-4 boasted of four names, viz.; "Northern," "Niagara," "Pocono" and "Confederation." For some unexplained reason, the Lackawanna R. R. never referred to their handsome 4-6-4's as "Hudsons," while the Central of Georgia, in a burst of anti-Japanese patriotism, renamed their Mikado types to "MacArthur."

Worth Reading

Compiled by

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Association of American Railroads, Washington 6, D. C.

Books and Pamphlets

Business and Railroad History: An Appraisal of Ten Years' Work, by Thomas C. Cochran, Univ. of Pennsylvania. 10 mimeo. 1. Address at 10th Anniversary Dinner, The Lexington Group, Chicago, Ill., April 16, 1952. Free from The Lexington Group Secretary, Northwestern Univ., Evanston, Ill. "... The Group may not have achieved an historical revolution in a decade. As yet it may not have convinced a large number of industry leaders of the value of scholarly, penetrating history, but it has established a machinery for doing so. As yet it may not have created a new body of railroad history, but Lexington, through its members has brought transportation economists and historians into initial contact with corporate records and executive letters. As yet, these contacts of men with men, and men with new sources have only begun to take effect, ..." (p. 8)

La Compagnie Internationale des Wagons-Lits et des Grands Express Europeens à Soixante-Quinze Ans, 1876-1951, by Roger Commault avec la collaboration de Maurice Mertens. Cover-tille, 18 p. incl. illus., facsimils., tables. Bibliography, p. 16. Paris, France, La Compagnie [International Sleeping Car Co.], 40 Rue de l'Arcade.

Directory of Railway Officials & Year Book 1952-1953 (58th year of publication), compiled from official sources under the direction of The Editor of The Railway Gazette. 558, 221 p. London, England, Tothill Press Ltd. 40 shillings. "... Once again it has proved impossible to secure reliable information from most of the 'iron curtain' countries of Eastern Europe. The reorganization of the railways in India was made too late for full details to be obtained, although both the general structure of the new regional railways, and also the names of the principal officers have been secured. New entries include the two government railways in Nepal; particulars of the Pan-American Railway Congress Association; considerably amplified details of the world's standardization societies; and substantially revised details of the railways in Germany ..." Preface, p. i.

Domestic Land and Water Transportation—Hearings before the Committee on Interstate and Foreign Commerce, U. S. Senate, 82nd Cong., 2nd Sess. on [37] bills . . . March 3 to April 9, 1952. XXVIII, 1712 p. "Printed for the use of the Committee . . ." Washington 25, D. C., U. S. Govt. Print. Off. Maps and Tables. *Contents* includes listings on testimony on each of the bills, pp. X-XXVIII.

Fitness, by Lewis K. Sillcox, exec. v. p., The New York Air Brake Co., Watertown, N. Y. 12 p. "... In the final analysis, we are entering an era where human relations are becoming one of the deciding factors of railway efficiency. Any study of operating results must take into account the personnel who make the railway's operation possible..." (p. 11) His address at Pennsylvania Railroad Juniata Shop Foremen's Annual Ladies Night, Juniata, Penna., May 3, 1952.

Freight Car Handling and Distribution, by E. W. Coughlin, manager, Railroad Relations, Car Service Division, A. A. R. 42 p. illus., tables, diagrs. Reprint of his articles in *Railway Age*, Feb. 11, March 24, April 21, May 26, June 23, and July 28, 1952. Order from Managing Editor, *Railway Age*, 30 Church St., New York 7, N. Y. 50 cents. In lots of 10, 45 cts. each; 25, 40 cts. each; 100, 35 cts. each.

Government Regulation of Transportation, by William T. Faricy, president, A. A. R. 9 mimeo. p. Address at School of Commerce, University of Southern California, Los Angeles, July 15, 1952. Free on request to A. A. R., Transportation Bldg., Washington 6, D. C.

Gt. Britain. British Transport Commission. Fourth annual report for the year ended 31st December 1951. 169 p. London, Eng., H. M. Stationery Office, 5 shillings. "Ordered by the House of Commons to be printed 11th July 1952." Its "Financial Accounts and Statistical Returns" was presented to Parliament in June 1952, and published as Cmd. 8572 by H. M. Stationery Office. 245 p. 7 shillings 6 pence. Each is for sale by British Information Services Sales Office, 30 Rockefeller Plaza, New York 20, N. Y.—the Report, \$1.25; Financial Accounts . . . , \$1.70. In preceding years, these were printed in one volume.

[*History of the Denver and Rio Grande Western Railroad Company*—*Remarks* by Wilson McCarthy, president, at 8th Convention Banquet, National Association of Railway Business Women, Colorado Springs, Colo., June 21, 1952. 15 mimeo. 1. Denver 1, Colo., D. & R. G. W. Ry. Free.

Indian Railways, White Paper on, by Ministry of Railways, Government of India, New Delhi. "As presented to Parliament in February 1952." 78 p. New Delhi, India, Govt. of India Press. "I. Introduction" pp. 1-18, reviews development of railways in India from 1845 to the present and "the plans which have been initiated to resolve them [current problems] to enable the Railway undertaking to fulfill its appropriate role in the economy of new India." "II. Explanatory Memorandum on the Railway Budget for 1952-53" pp. 19-73.

Joseph B. Eastman—Servant of the People, by Claude Moore Fuess. xv., 363 p. Illustrated. New York, Columbia University Press, \$5.00. "The Independent Commissioner," Ch. VII. "Federal Coordinator of Transportation," Ch. XI. "The Last Big Job"—"director, Office of Defense Transportation," Ch. XIV.

Milestones of Progress—Talk by Carlton J. Corliss, manager, Public Section, A. A. R. at "Railroad Night" dinner, Miami Junior Chamber of Commerce, Miami, Fla., July 29, 1952. 16 mimeo. 1. Washington, 6, D. C., A. A. R. Free on request. "... I came to Miami in my youth, and under Henry M. Flagler, and his engineers, Joseph C. Meredith and William J. Krome, I had a small part in the great work of building the Florida East Coast Railway over the Florida Keys to Key West. Since I first came here, I have seen Miami grow from a small city of seven or eight thousand to the immense metropolis it is today, and I have seen the state more than treble in population. ..."

The Northern Railroads in the Civil War 1861-1865, by Thomas Weber. XII, 318 p. New York City, Columbia University Press. "The construction of railroads has introduced a new and very important element into the war." Gen. G. B. McClellan, Aug. 4, 1861, quoted at head of Ch. III—Emergency Problems in 1861. Ch. XIV—The War and the Railroads summarizes the details brought out in previous chapters:—1. *Railroad Contributions to the Science of War*. ... The most important single contribution ... was mass transportation of troops and supplies. ... (p. 220). For the military, which in America is always confronted with the problem of relations with the civilian element, it was a valuable lesson which showed how important civilian workers could be in prosecuting a war ... (p. 224) ... another contribution ... the development of more efficient methods of construction and destruction of track and bridges ... (p. 224-225). One final contribution ... was the development of special equipment, chiefly hospital cars, hospital trains, and armored cars ... (pp. 225-228). 2. *War Contributions to the Science of Railroad*ing. The war demands ... forced the railroads to develop new ways of doing things and new materials for use in equipment and rolling stock. These developments were just as important to the railroads as their own contributions were to the military men. One of the new ways of doing things was the enforced cooperation among railroads to meet the demands of the war period ... (pp. 228-229). A second ... the establishment in 1864 of railway post office cars ... A third ... was the shift from iron to steel ... wood to coal as fuel ... (pp. 230-232).

The Northland—Ontario, by O. G. T. Williamson. Illustrated by Evan Macdonald. ix, 110 p. Toronto, Ontario, Canada, The Ryerson Press. \$1.50. "... For any railway, romance is of its essence from the day of its inception until 'Romance brought up the 9:15.'" Of none is this more true than of the Temiskaming and Northern Ontario. ... To speak of a railway having been built involves a misconception. Railways are never built but always building. A last tap may be given to a cathedral or a hen-coop but never to a railway. The Temiskaming and Northern Ontario is no exception ... (p. 13). "Pioneers All" pp. 109-110, are poems about

"The Trapper;" "The Lumberjack;" "The Settler;" "The Engineer" [railroad construction]; "The Prospector."

Pan American Railway Congress, Washington, D. C. and Atlantic City, N. J., June 12-25, 1953. Invitation—Suggested Subjects [for papers]. Cover-title, 48 p. Issued by The Department of State, Washington, D. C., June 1952. Copies free on request from The Executive Secretary, Organizing Committee, VIII Pan American Railway Congress, 803 Transportation Bldg., Washington 6, D. C. Spanish edition also available.

Progress in Railroad Research, by James H. Aydelott, vice president, Operations and Maintenance Dept., A. A. R. 10 mimeo. 1. Free on request to A. A. R., Transportation Bldg., Washington 6, D. C. "Two years ago, on the campus of the Illinois Institute of Technology, in Chicago, the Association of American Railroads opened a Central Research Laboratory to serve as a 'nerve-center' for the long established and widespread research activities of the railroad industry. This year, reflecting the growing emphasis on the subject, another laboratory is being built adjoining the first, in which much of the mechanical research previously carried on will be centralized. In these laboratories, and also in the laboratories of universities, technological institutions, and individual companies, and in test projects on the great 'proving ground' of 225,000 miles of railroad, research engineers and technicians are doing, directing and coordinating research projects that are having a profound effect on the character of railroad transportation in America. . . . How inter-industry cooperation on railroad research can make striking gains is nowhere more evident than in the development of the diesel-electric locomotive. . . ."

Railroading in New Jersey, by John T. Cunningham, Cover-title, v. 106 p., illustrated. Reprint of 17 historical articles published in the Newark Sunday News Magazine from Jan. 7 to April 29, 1951. Bibliography on inside back cover. Free from Associated Railroads of New Jersey, Room 274, Pennsylvania Station, New York 1, N. Y.

Railroads Discover Oil, Merrill Lynch, Pierce, Fenner & Beane, 70 Pine St., New York 5, N. Y., May 1952. 31 p. Free. Index of the 17 railroad companies, back cover. Map of Williston Basin pp. 16-17. "When you invest your money in railroad stocks you don't usually expect to wind up in the oil business as well . . ."

Railroads in the U. S. A.—Report by a group of European experts, who comprised Technical Assistance Mission No. 14. 2 vols. Paris, France. Organization for European Economic Co-operation, March 1952. May be purchased in U. S. A. from Columbia University Press, 2760 Broadway, New York 27, N. Y., which will give the price in dollars. *Part I—General Study*, includes "Composition of the Mission"—Appendix A, and "British and American Terminology"—Appendix B. *Part II—Group Reports* contains: I—Mechanical; II—Operating; III—Communications and Signals; IV—Permanent Way and Structures; V—Statistical; VI—Tariffs,

Economics, Traffic; VII—Electrification; VIII—Manufacturing. Also contains the Appendices from Part I.

A Review of Railway Operations in 1951, by Julius H. Parmelee, vice-president and director, Bureau of Railway Economics, A. A. R. 51 p. incl. tables. BRE Special Series No. 84, reprinted by permission from *Railway Age*, Jan. 14, 1952. Revised to April 15, 1952. Free from AAR. BRE. Transportation Bldg., Washington 6, D. C.

Sound Transportation for the National Welfare—Report to Board of Directors, Transportation Association of America, by the Policy Administration Board, Co-operative Project on National Transportation Policy, April 1952. 225 p. Summary under title: *America Needs Sound Transportation*. 35 p. Chicago 6, Ill., Transportation Association of America, 130 N. Wells St.

Uniform Freight Classification No. 1. Issued Feb. 1, 1952. Effective May 30, 1952. 489 p. *Index to Rules*, pp. 15-17. *Index to Articles*, pp. 18-126, begins with A-frame legs, power shovel, and ends with Zithers, guitar. *Bills of Lading Forms*, pp. 156-177. *Ratings*, pp. 178-433. *Authorized Packages or Shipping Containers*, pp. 434-489. Published by agents for lines in Official, Southern, Illinois, and Western Classifications. Copyright by Geo. H. Dumas, Agent for lines in Western Classification, 202 Union Station, Chicago 6, Ill., from whom copies may be purchased for \$3.50 each.

United States Army in World War II—The Middle East Theater—The Persian Corridor and Aid to Russia, by T. H. Vail Motter. xvii, 545 p. fold. maps, illus., diagrs. For sale by Superintendent of Documents, U. S. Govt. Print. Off., Washington 25, D. C. \$3.50. "Oil for the War" Ch. XV. "The Railway" Ch. XVII.

United States Army in World War II—The Technical Services—The Transportation Corps: Responsibilities, Organization and Operation, by Chester Wardlow. xvii, 454 p. illus., port. For sale by Superintendent of Documents, U. S. Govt. Print. Off., Washington 25, D. C. \$3.25.

U. S. Freight Car Study, March 1952, to establish requirement and production goals and tax amortization goal . . . [etc], by U. S. Defense Transport Administration, Washington 25, D. C. *Its Release* of March 17, 1952. 17 mimeo. 1. Its later releases, and A. A. R. Car Service Division's monthly "National Transportation Situation," keep one up with progress toward "goals."

The Western Maryland Railway Story—A Chronicle of the First Century 1852-1952, by Harold A. Williams. Contemporary photography by A. Aubrey Bodine. [xiv], 134 p. Illus. Baltimore, Md., The Western Maryland Railway Co.

Bibliographies

Applications of Electricity to Railways 1951. Bibliography of periodical articles appearing in a select list of periodicals covering the calendar year 1951, prepared by Edmund Arthur Freeman, assistant librarian, Bureau of Railway Economics Library, A. A. R.,

Transportation Building, Washington 6, D. C. 43 p. Free on request to BRE Library.

Soviet Transportation and Communications—A Bibliography, compiled by Renee S. Janse, Reference Department, Library of Congress. XV, 330 p. Key to symbols of the 47 libraries, including BRE, the material in which is included, pp. xiii-xiv. "VII. Railroads" pp. 36-137. For sale by Card Division, Library of Congress, Washington 25, D. C. \$2.25. "Purchases from Foreign Countries . . . may be made with *UNESCO BOOK COUPONS*."

United States Railroad Administration Publications—A Bibliography, compiled by Helen R. Richardson, reference librarian. 200 p. Washington, 6, D. C., Association of American Railroads, Bureau of Railway Economics. Free.

Articles in Periodicals

Beyer-Garratt locomotives for Benguela Railway—a modernized version of a powerful design on a 13-ton axleload with tractive effort of 52,360 lb. Gradient profile and map of railway and its connections. Wood-burners for a 3' 6" gage line.

A Brief report on locomotive development, by W. A. Brecht. New York Railroad Club Official Proceedings, March 20, 1952—annual electrical night, pp. 89-92.

British Locomotive Practice and Performance, by Cecil J. Allen. The Railway Magazine, London, Eng., June 1952, pp. 405-410-420.

Canadian freight traffic issue. Railway Age, July 7, 1952. 184 p. incl. maps, charts, tables, and advertisements carrying out theme. "What is Canada?" pp. 98-104. "A Portfolio of Pioneering Railways" pp. 128-147. ". . . seven . . . There are big stories in these frontier lines of 1952."—CNR Kitimat Branch; The Quebec, North Shore & Labrador . . . Iron Ore by '54; CNR Lynn Lake Line—a railway key to new mineral treasure; The Romaine River . . . a brand-new railway for a brand-new product [ilmenite (iron ore and titanium)]; Algoma Central & Hudson Bay . . . a timer and iron ore railroad; Pacific Great Eastern . . . British Columbia's development road; The Ontario Northland . . . 'Ontario's development road.' ". . . This road's name was changed from Temiskaming & Northern Ontario in 1946 because its management grew tired of its being confused with the Texas & New Orleans and having its cars move to the wrong 'home.' . . ."

Car handling—a job that never ends, by Caleb R. Megee, vice chairman, Car Service Division, A. A. R. Railway Club of Pittsburgh Official Proceedings, May, 1952, pp. 70-78. ". . . Some may well ask—what are Car Service Rules and why are they necessary? With the advent of the free interchange of cars between railroads, not only in the United States but to and from our neighbor to the north and our neighbor to the south, there arose complexities in car handling. Owners naturally lose the use and physical control of equipment after it leaves home rails. There developed the neces-

sity for a Code of practical rules whereby the rights and responsibilities of owners and users are defined. Therefore, the Code of Rules, dealing with car handling, which I believe for the first time, was set up in national scope in 1893 . . ." (p. 72).

Chinese railway developments—communications essential for economic progress in a country of vast distances. "(From a Correspondent)." The Railway Gazette, July 4, 1952, pp. 10-11. "A Chinese offer to buy British-built locomotives which is reported to have been made at the Moscow Economic Conference reflects the great plans that the Central People's Government have launched to modernize and extend the Chinese railway system. . . . Since 1949 the Soviet Union has been supplying some of China's needs, particularly rail, but the interest in British exports shown by the Chinese delegates to the Moscow meeting indicates that Government policy is to meet pressing requirements as quickly as possible from whatever quarter. . . ."

The Effect of the Civil War and the two World Wars on American transportation, by John C. B. Hutchins. American Economic Review, May 1952, pp. 626-638, with Discussion pp. 639-643.

Electric locomotives for Spain. The Railway Gazette, May 2, 1952, p. 478, 501. Co-Co . . . 3,600 h. p. for the 5' 6" gauge. " . . . The most powerful yet built in this country . . ."

Essais de la locomotive monophasée à 50 hz CC. 6051 Oerlikon sur la ligne d'Aix-les-Bains à La Roche-sur-Foron et sur la ligne allemande du Hollenthal. Révue Générale des Chemins de Fer, May 1952, pp. 216-222. Profiles, graphs, chart, and photograph of locomotive. Summary in English.

Gas-generator locomotive in France. Diesel Railway Traction—A Railway Gazette publication, August 1952, pp. 187-198. Diagr.s. Sectional arrangement. New design, using principles tested by Gotaverken in Sweden, 1933-1937. Editorial comment, pp. 195-196.

How Holland has rebuilt its electrification—almost total war-time destruction of the Netherlands Railways permitted free selection, but after careful consideration, the original 1,500-volt direct current system was re-established. by A. H. Candee, transportation engineer, Westinghouse Electric Corp. Railway Age, September 1, 1952, pp. 101-105. Paper at summer general meeting, American Institute of Electrical Engineers, Minneapolis, Minn., June 1952. Illustrated. Written discussion by J. P. Koster, chief engineer, traction and rolling stock department, Netherlands Railways, p. 105.

The Human spirit in the transport industry, by C. E. R. Sherington. The Journal of the Institute of Transport, London, England, May 1952, pp. 371-374.

Indian regrouping completed—inauguration of Eastern, North Eastern, Northern Railways marks final stage of projects. The Railway Gazette, May 30, 1952, pp. 597-599. Maps show different gages. Ed. comment: *The new Indian Railways*, pp. 591-592.

Locomotives for Tasmania designed to negotiate a minimum curve of 330 ft. without widening the gauge [3' 6"]. The Railway Gazette, May 2, 1952, pp. 493-494. Illus. and diagrs.

Maintenance of way—a tribute to those who give meaning to the phrase, by Max K. Ruppert. Pacific Railway Club. Official proceedings, January 17, 1952, pp. 11-23.

The Miniature Locomotive—The Live Steamers' Magazine. Vol. 1, no. 1, May-June 1952—. Published monthly by Richard B. Bagley and Robert A. Day, 6904 Geyser Ave., Reseda, Calif. Subscription: \$3.00.

Modern standard gauge Beyer-Garratts for New South Wales—An outstanding design of a high tractive effort on 16-ton axle-load, capable of running over practically the whole system. The Railway Gazette, July 4, 1952, pp. 12-17. Illus. and map of railway system. Ed. comment: Articulated locomotives for New South Wales, pp. 3-4.

1902-1952. *Bulletin des CFF, Juin 1952*. Illus., Maps. Special issue of the Bulletin of the Chemins de Fer Fédéraux, Switzerland, commemorating their 50th anniversary as "les Chemins de Fer Fédéraux." Editorial comment: Jubilee of the Swiss Federal Railways. The Railway Gazette, May 2, 1952, p. 481.

Une Nouvelle Locomotive à turbine à gaz avec generateur à pistons libres, by F. Picard. Revue Générale des Chemins de Fer, May 1952, pp. 189-199. Illus. and diagrs.

Old Mexico's railroads go modern—improvement program pressed as essential to the country's industrialization. Railway Age, September 1, 1952, pp. 77-82. Map and illus. "... About the time this story is published, the last important narrow-gage trackage—400 miles from Mexico City to Puebla and Oaxaca, with branches—will be standardized, leaving only 280 miles of narrow-gage trackage, all on secondary lines. ... The Pan-American route from Ixtepec in the Tehuantepec Isthmus to Suchiate, on the Guatemalan border, is undergoing complete rehabilitation ..." (p. 81). "Use of diesels increasing" pp. 81-82.

117 years of Long Island railroading—I. Long Island Railroader, June 1952, pp. 8-10. Ed. note: "... For some time the railroad has been deluged with requests for historical information. There has not been much available. ... Some bits of information have been gathered in the past few months, and it was decided to print in the Railroader, starting with this issue as complete a history as can be found. Anyone who saves his copies of the Railroader will have in about 20 to 24 issues, the most complete history of the Long Island ever assembled."

Operating the Saudi Arabian Railway—credible schedules involving extensive use of air-conditioned railcars. The Railway Gazette, June 6, 1952, p. 634. Illus. Opened Oct. 20, 1951 between Dammam, on the Persian Gulf, and Rivadh, the capital. "... [The schedules] were drawn up by the nucleus of Americans employed

on the line . . .—in consultation with Government representatives and Israeli, Italian and Arab staff . . .”

The Organisation and activities of the International Union of Railways [U. I. C.]. Bulletin of the International Union of Railways, English edition, May 1952, pp. 132-137. Folded plan of organization also lists: “Non-governmental organizations” and “Governmental organizations.”

Passenger Traffic Number—1952. Railway Age, May 19, 1952. 194 p. Illus. “A Program for profitable passenger business” pp. 93-94. “Incentive for insiders, too” pp. 94-95. “Trains That Pay” . . . ten samples . . . pp. 96-101. “Travel by Train—A Railway Age Feature” pp. 143-174, includes “Parade of the Streamliners”—map.

Powered like a jet—Gas turbine electric locomotives are bringing new zip and power to heavy, long-haul freight trains. Steel Horizons, Spring 1952, p. 24.

Some unwritten Minnesota novels, by Stewart Holbrook. Minnesota History, Summer 1952, pp. 45-52. “. . . Hans Mattson . . . worked for the Northern Pacific . . . Oliber Hudson Kelly . . . conjured up what became the Patrons of Husbandry, or the Grange. . . . James Jerome Hill is of course one of the truly great characters who are properly identified with Minnesota . . .”

A Survey of diesel traction. Diesel Railway Traction, London, England, June 1952, (241) Special survey number. Illus. Diags. “. . . to show what has been done since 1939, and in particular what has been done in the last two or three years . . . To make this survey . . . we suggested to Mr. Brian Reed . . . that he should undertake such a survey in our behalf.”

Vitamins for the Iron Horse, by John W. Barriger, president, The Monon. Pacific Railway Club. Official Proceedings of the 35th annual meeting, March 27, 1952. Part I, pp. 9-25. Reprinted under title: Rate “ceiling” at truck costs would greatly increase revenues—where “inherent advantages” are the railroads’, their interest and the public’s require competitive pricing, in Railway Age, July 28, 1952, pp. 31-34. Ed. note, p. 31: “This proposal . . . is published with the full knowledge that such publication risks the misinterpretation that either Mr. Barriger or this paper, or both of us, are not wholly in accord with the position of the railroads in the Ex Parte 175 proceeding. Such a conclusion would be completely in error. . . .”

Wagons standard U. I. C. affectés au trafic international, by L. Rimbaud. Revue générale des chemins de fer, May 1952, pp. 200-206. Illus. and diags.

The WESTERN MARYLAND joins the “Century Club.” Railway Age, May 12, 1952, pp. 53-64. Illus., Map. Profile. Many advertising pages contribute centennial tributes to the Western Maryland.

What is RIGHT with the railroads? by Arthur C. Roy. Distribution Age, August 1952, pp. 19, 56-58.

New Books

Handbook of American Railroads, by Robert G. Lewis, 239 pages, $8\frac{1}{8} \times 5\frac{3}{8}$. Illustrated. Published by the Simmons-Boardman Publishing Co., 30 Church St., New York, N. Y. Price \$2.95

The publication of this handbook covering the salient facts and features of each of the 127 Class 1 railroads has filled a long-felt need and the author and publisher are to be congratulated in its form of presentation. Three pages are devoted to a description of the terms and the use of this handbook. For each railroad is listed the different revenues, net income, operating ratio and gross ton miles per train hour. Another table listing other statistics and equipment data is also of value. With each road there is a map and there is also a good description of the carrier; the type of freight it hauls; its passenger traffic; the connecting carriers, etc. Here we have in handy book form the important information and interesting data of each carrier. To obtain this information the author must have consulted many sources but he has arranged it so that the present statistics may be compared with last year and he has standardized them so that one road may be compared with another. In addition to being listed alphabetically, there is an index for every railroad. For those that seek and use this information, they can't do better than own a copy of this handbook.

Rights of Trains, by Harry W. Forman, revised by Peter Josserand, 397 pages, $7\frac{1}{4} \times 4\frac{3}{4}$. Published by Simmons-Boardman Publishing Co., 30 Church Street, New York, N. Y. Price \$4.95.

This is the fourth edition of the work of the late Harry W. Forman, Assistant to Vice President and General Manager of the Western Pacific R. R.

In 1889 the General Time Convention adopted the first *standard code*, designated as Uniform Train Rules and Rules for the Movement of Trains by Telegraphic Orders. It represented the accumulated knowledge of the best operating minds in the industry. Since that time there have been many inventions that have improved operating conditions, traffic density has increased, multiple tracks have replaced single track operation and it has been necessary to make revisions to the Standard Code during the past sixty years. This Fourth Edition sets forth the basic principles underlying the rules and shows how the rules of the various roads differ from the Standard Code and from each other. I don't know how many of our members are interested in this subject of train operation but the author has gone to no little trouble to explain the reasons behind each rule in the Standard Code. It is an up to the minute book on the subject and the author is amply qualified in the knowledge of this subject.

Chronicles of a Country Works, by R. H. Clark, 303 pages, $9\frac{3}{4} \times 7\frac{1}{4}$, illustrated. Published by Percival Marshall & Co. Ltd., 23 Great Queen St., London, W. C. 2, England, Price £3/3/—.

What the railway locomotive owes to Robert Stephenson, the road locomotive owes to Messrs. Charles Burrell & Sons Ltd. and this book is a story of their works. The firm was established in 1770, were cup winners for agricultural machinery in 1803, made the first portable engine in Norfolk in 1848 and the first heavy duty steam road haulage engine in 1856. Road engines capable of 20 m.p.h. and, in subsequent years, marine engines, these with various types of machinery were the main products of this famous firm. In the appendix will be found the brief details of every engine made, so far as existing records show—nearly 4000 of them. The last one was built in 1932.

This is the unique history of a family enterprise during the Industrial Revolution. Here we have the movement from the country to the town but we also have the reverse, from the town to the country and the subsequent decline of a great industry.

The reader will not find it a treatise on steam or traction engine design, nor is it filled with higher mathematics. Furthermore, no footnotes have been used, that irritating distraction of losing the place in one's reading. The author has produced a very interesting volume on the Burrell family and its products.

Building & Laying "O" Gauge Trackwork, by E. F. Carter, 105 pages, $7\frac{1}{4} \times 4\frac{3}{4}$, illustrated. Published by Percival Marshall & Co. Ltd., 23 Great Queen St., London, W. C. 2, England. Price 9/6.

How many of our members are interested in model railways, this reviewer has no way of knowing. This book is designed to eliminate the troubles in track construction. Correctly gauged wheels, with good track construction are the key to success. No track can be laid by guess work and any carelessness on the part of the track-builder will be reflected in frequent derailments. The book is liberally illustrated with actual railroad scenes and track diagrams with tables at the end of the little volume and for one interested in model railways it would seem as though this book would be of untold value.

**Minutes of
Special Meeting
of the**

Railway & Locomotive Historical Society, Inc.

A special meeting of the Railway & Locomotive Historical Society, Inc., was held at 12:00 noon at the office of Howard F. Greene, 44 School Street, Boston, Mass. on April 3rd, 1952 for the purpose of considering amendments to the By-Laws as stated in the notice of said meeting.

President Fisher was Chairman of the meeting and the following members were present: Messrs. Fogg, Fisher, Merrill, Forsyth, Harrison and Greene.

Mr. Harrison, Chairman of the By-Laws committee presented the report of his Committee, appointed at the last Annual Meeting.

Upon motion, duly seconded, it was unanimously voted to accept the Committee report and the new code of By-Laws promulgated by the Committee.

Upon motion, duly seconded, it was unanimously voted to thank the By-Laws Committee for their work and to discharge them from further duties.

The meeting was then adjourned.

A true record

Harold D. Forsyth, *Secretary*

**Minutes of
The Annual Meeting
of the**

Railway & Locomotive Historical Society, Inc.

The Annual Meeting of the Railway and Locomotive Historical Society, Inc., was held at the Hotel Bellevue, Boston, Mass., at 2:30 P.M. on Sunday, May 4th, 1952 with the following members present: Messrs. Stanley Barriger, Becker, Fisher, Fogg, Forsyth, Graves, Greene, Harrison, Kemble, Merrill, Parker, Richardson, Schmid, Shepherd, Twommey and Yungmeyer.

President Fisher was Chairman of the Meeting.

The Secretary read the reports of the last Annual Meeting and of the Special Meeting of April 3rd, which were accepted.

Reports of the President and Treasurer were accepted as published.

A vote of thanks was unanimously extended to H. S. Walker for his long service as Financial Secretary.

A standing Committee on Chapter By-Laws was appointed by President Fisher, who named D. W. Yungmeyer to act as Chairman.

Mr. Merrill, representing the Nominating Committee, offered the following names for the office of Director:

To serve until 1953: George P. Becker

H. L. Harrison

John W. Merrill

R. E. M. Whitaker

To serve until 1954: A. H. Cole
H. D. Forsyth
D. W. Yungmeyer
To serve until 1955: R. C. Schmid
H. F. Greene
C. E. Fisher
W. R. Fogg

Motion was made, seconded and unanimously voted that the Secretary cast one ballot of the above named and they were declared elected.

Meeting was then adjourned.

A true record
Harold D. Forsyth, *Secretary*

At a meeting of the Directors, held immediately following the Annual Meeting of the members, on May 4th, 1952, the following officers were elected:

PRESIDENT	Charles E. Fisher
TREASURER	George P. Becker
SECRETARY	Harold D. Forsyth
FINANCIAL SECRETARY	Howard F. Greene
VICE-PRESIDENT	D. W. Yungmeyer

The Memberships fees were fixed, effective October 1, 1952 as follows:

Annual Membership	\$5.00
Contributing Membership	10.00
Life Membership	100.00

It was regretted that the necessity of increasing the fees has been forced upon the Society by the constantly increasing cost of all publications.

Harold D. Forsyth, *Secretary*

Before increasing the dues of the Annual Members, our Directors considered several possibilities before arriving at the above figure. Since 1921, through good times and depression and through peace and World War II, we have held these dues at the \$3.00 figure. Call it what you will, inflation or the depressed dollar, the fact is that a dollar today has not the purchasing power of a dollar of even only seven years ago. This change in values has affected everyone and, the Society is no exception. It is no longer possible to furnish our members with two bulletins, a Membership Roster and an Annual Report, all for \$3.00. The Directors fully realize that our Chapter Members will probably feel this increase more keenly than those who do not hold a chapter membership. Some chapters have already taken action to relieve the situation and this will be a help.

The present plan calls for two bulletins annually. These will be enlarged so as to include approximately the same number of pages that we have allotted the three published each year. We

believe this will make for a better publication and it will also be the means of all members receiving our publications. It does not mean that the special bulletins will be abandoned because they can and will be published, with due notice, from time to time, but it does eliminate their annual publication. We hope that all of our members will understand the situation and that all will continue their membership.

Charles E. Fisher, *President*

In Memory of

H. E. Hale
Annual Member
New York, New York
Who Died on June 15th, 1952

